

RG 104, 8NS-104-94-077  
Box 3

8NS-104-94-077, Miscellaneous  
Correspondence & Memos, 1897-1994

Dance-Mint Improvement Study 1978



## DENVER MINT IMPROVEMENT STUDY

- 1.0 Define the Problem prepare over-all plan of action, and submit report to the office of Production by 3/24/78
- 1.1 List Perceived General Problem Areas
- 2.0 List General Potential Solutions
- 2.1 List various Alternatives
- 3.0 Limiting Factors
- 3.1 List general parameters
- 4.0 List and Identify Action Items
- 5.0 Initiate, Assign, and Schedule Actions
- 6.0 Identify Specific Problems
- 7.0 Investigative Actions and Conclusions
- 8.0 Investigation Action Assignments

Revised April 21, 1978



## 1.0 The Problem

The Denver Mint must improve material flow, materials handling procedures, and the general work environment and must be capable of meeting 1985 projected production requirements.

### 1.1 Perceived General Problem Areas.

- 1.1.1 Excessive noise levels.
- 1.1.2 Overcrowded conditions (office, maintenance, & production areas)
- 1.1.3 Unbalanced and inadequate ventilation.
- 1.1.4 Structure is overloaded or loaded to limit.
- 1.1.5 Excessive energy usage and energy waste.
- 1.1.6 Excessive effort required for material handling.
- 1.1.7 Excessive floor damage and maintenance costs.
- 1.1.8 Double handling of process materials.
- 1.1.9 Cross-flows of process materials.
- 1.1.10 OSHA standards not being met.
- 1.1.11 Electrical deficiencies.
- 1.1.12 Wasted space.
- 1.1.13 High temperatures in summer, cold areas in winter.
- 1.1.14 Security and Fire Protection systems need improvement.

2.0 General Potential Solutions.

2.1 Alternatives.

2.1.1 Use existing building and process layouts making minor changes to correct deficiencies.

2.1.2 Use existing building and site but start with "empty shell" approach and establish optimum use of existing facilities.

2.1.3 Use existing building and site and move some production processes to south Butler building.

2.1.4 Use existing building and site and move some production processes to two south Butler buildings.

2.1.5 Use existing building and site. Raze two south Butler buildings and build one new structure on site of Butler buildings.

2.1.6 Use existing building and site but extend building to include south roof area beyond existing Metal Working/Preventive Maintenance shop.

2.1.7 Use existing building and site but extend dock area along entire south side of building and add new enclosed structure at ground level on 1st floor level from west dock south, to provide additional space for production operations.

2.1.8 Any combination of 1 thru 7 above.

2.1.9 Use existing building and site but move some production processes to off-site government facility.

- 3.0 Criteria, Restrictions, Conditions
- 3.1 The general parameters to be considered are:
  - 3.1.1 Satisfy OSHA requirements:
    - Environment (sound, pollution, safety, etc.)
    - Electrical
  - 3.1.2 Plan to satisfy projected coin production needs through 1985 for Western Sector. Annual SFAO capability is 1,800 million cents with Denver - supplied blanks @250,000 lbs/week.
  - 3.1.3 If Denver (within existing buildings) cannot meet the required demand, SFAO to take-up to 1,800 million cents/year first, before any Denver on or off-site expansion can be considered.
  - 3.1.4 Production capability to be based on 3 shift - 8 hr. - 5 day operation.
  - 3.1.5 5¢ - \$1.00 coins must be produced on existing property.
  - 3.1.6 Off-site production, if required, limited to any or some combination of following:
    - 3.1.6.1 Blanking of cents
    - 3.1.6.2 Annealing of cent blanks
    - 3.1.6.3 Riddling of cent blanks
    - 3.1.6.4 Upsetting of cent blanks
    - 3.1.6.5 Stamping of cents
    - 3.1.6.6 Post-stamp riddling of cents
    - 3.1.6.7 Storing cents
    - 3.1.6.8 Shipping cents
    - 3.1.6.9 Blanking of all other blanks
    - 3.1.6.10 Annealing of all other blanks
    - 3.1.6.11 Post-anneal riddling of all other blanks
  - 3.1.7 Bulk shipment of a portion of 1-cent coins to FRB's in the future is a likelihood.



Use below - projected production needs:

3.1.8.1

MILLION PIECES (Annually)

<u>FY</u>	<u>1¢*</u>	<u>5¢</u>	<u>10¢</u>	<u>25¢</u>	<u>50¢</u>	<u>1.00</u>	<u>TOTAL</u>
1979	4200	361	528	440	53	36	5618
1980	4620	396	572	484	57	42	6171
1981	5040	433	616	528	66	45	6728
1982	5460	475	664	581	97	48	7325
1983	5922	519	717	638	119	54	7960
1984	6426	568	774	704	132	60	8664
1985	6930	616	836	792	132	60	9366

\* Includes SFAO 1.8 billion /coins/ year with Denver supplied blanks when Denver capacity within existing building is exceeded.

3.1.8.2

MILLION PIECES DAILY (24 HRS)

<u>FY</u>	<u>1¢*</u>	<u>5¢</u>	<u>10¢</u>	<u>25¢</u>	<u>50¢</u>	<u>1.00</u>	<u>TOTAL</u>
1979	17.5	1.5	2.2	1.83	.22	.15	23.4
1980	19.25	1.65	2.38	2.0	.24	.175	25.7
1981	21.0	1.8	2.57	2.2	.275	.19	28.03
1982	22.75	1.98	2.77	2.42	.40	.2	30.52
1983	24.67	2.16	2.99	2.66	.46	.225	33.16
1984	26.775	2.37	3.225	2.93	.55	.25	36.1
1985	28.875	2.57	3.48	3.3	.55	.25	39.03

3.1.9 Off-site expansion on assumed or available government facility must be one of the alternatives to be considered (without any expansion of present space), and compared to on-site expansion.

- 4.0 Action Items
  - 4.1 List Machine production capacities.
  - 4.2 Make "as-Built" layouts of site and floor plans.
  - 4.3 Make layout drawings showing ventilation equipment and air flow volumes.
    - 4.3.1 Measure air flow volumes.
  - 4.4 Determine and list optimum equipment spacing requirements and arrangements.
    - 4.4.1 Blanking equipment
    - 4.4.2 Annealing equipment
    - 4.4.3 Coining equipment
      - 4.4.3.1 Bliss quad presses
      - 4.4.3.2 Columbia presses
      - 4.4.3.3 Conventional presses
    - 4.4.4 Riddling equipment
    - 4.4.5 Upset mills
    - 4.4.6 Counting & Bagging equipment
    - 4.4.7 Maintenance Shops and equipment
    - 4.4.8 Make optimum layout sketches for above.
  - 4.5 Make drawings showing existing production equipment layout and coin sotrage and shipping facilities.
  - 4.6 Review office layouts and identify deficiencies.
    - 4.6.1 Review organizational structure.
  - 4.7 Review visitors tour routes and identify proposed changes.
  - 4.8 Identify floor load limits on layout drawings.
  - 4.9 Identify energy losses on layout drawings.
    - 4.9.1 Measure energy losses.
  - 4.10 Identify on dwgs material flow and the existing material handling methods.
  - 4.11 List and identify OSHA non-compliance.
  - 4.12 List and identify electrical deficiencies (specific locations)

- 4.13 List and identify air, steam, and water piping deficiencies (specific locations).
- 4.14 Identify areas of double handling of materials. (list and/or show on flow diagrams).
- 4.15 Identify areas of cross-flows of material (list and/or show on flow diagrams).
- 4.16 List and show on floor plan and/or site layouts areas of "wasted" space.
- 4.17 Identify and show on drawings areas where temperatures are uncomfortable; winter; summer.
- 4.18 Identify and List on layout drawings all noise levels.
  - 4.18.1 Measure noise levels and record parameters used.
  - 4.18.2 Investigate materials and methods for noise treatment of manufacturing space.
- 4.19 Conduct Survey Requesting Input from 1st Line Supervisors.
- 4.20 Identify Security and Fire Protection problems.
- 4.21 Visit Winnipeg Mint and Philadelphia Mint for Ideas.
- 4.22 Identify impact of palletized coin shipping on existing storage and shipping facilities.



## 5.0 Action Items Assigned

<u>Action Item (para.) No.</u>	<u>Responsibility*</u>	<u>Sched. Compl. Date</u>
4.1	Summers, Lord	4/14
4.2	Vaitaitis	4/21
4.3	Neal, Morgan	5/19
4.3.1	Neal, Morgan	5/5
4.4.1 through 4.4.8	Vaitaitis & activity supervisor	6/9
4.5	Summers, Lord	5/5
4.5.1	Vaitaitis	5/26
4.6	Div. Heads	4/28
4.6.1	Div. Heads	4/28
4.7	Div. Heads	4/14
4.8	Neal	5/5
4.9	Neal	5/26
4.9.1	Neal, Morgan	5/19
4.10	Summers, Lord	5/19
4.11	Vaitaitis, Safety Officer, Billapando	6/2
4.12	Vaitaitis, Miller	4/28
4.13	Gose	4/28
4.14	Vaitaitis	5/19
4.15	Vaitaitis	5/19
4.16	Vaitaitis	5/12
4.17	Billapando	5/26
4.18	Billapando	6/9
4.18.1	Lord, Billapando	5/31
4.18.2		6/23
4.19	Vaitaitis	4/22
4.20	Vaitaitis, Reavey, Barwinski	5/19
4.21	Vaitaitis	4/7
4.22	Langhorn	4/21

\* Includes coordination of required drafting.



6.0 Specific Problems.

- 6.1 Punch Press Noise Levels exceed 85dBa
- 6.2 Coin Press Noise Levels exceed 85dBa.
- 6.3 Riddler Noise Levels exceed 85dBa.
- 6.4 Annealing area - CO levels often exceed 50ppm.
- 6.5 Annealing area-summer temperatures often exceed 110° F.
- 6.6 South Production Area (1st Floor) - area is cold in winter when south dock door remains open.
- 6.7 General cluttered, drab appearance throughout Mint.
- 6.8 Floors are continually damaged from dropped tanks and truck wheels.
- 6.9 Oil, grease and dirt tracked into office areas.
- 6.10 Employees track in snow, mud and grit through front entrance.

- 7.0 Investigative Actions.
- 7.1 Enclose a punch press to evaluate noise reduction.
- 7.2 Evaluate methods of reducing coin press noise levels.
  - 7.2.1 Enclose feed tank/feeder bowl assembly.
  - 7.2.2 Investigate noise reduction due to feed finger assembly.
- 7.3 Investigate potential layouts of Equipment in existing facility.
  - 7.3.1 Make improved equipment layouts within existing facilities to correct deficiencies.
  - 7.3.2 Show revised process flow.
- 7.4 Evaluate existing organizational structure and project changes thru 1985.
- 7.5 Evaluate potential for automated handling of material.
- 7.6 Investigate the availability of off-site government facilities.
  - 7.6.1 Investigate availability of natural gas at off-site facilities.
  - 7.6.2 Investigate availability of sewer facilities at off-site facilities.
  - 7.6.3 Investigate availability of utilities at off-site facilities.
  - 7.6.4 Investigate availability of employee conveniences at off-site facilities.
- 7.7 Make optimum layouts of facilities.
  - 7.7.1 optimizing use of office space to meet 1985 projections.
  - 7.7.2 improving tourist routes as proposed.
  - 7.7.3 improving employee access to building.
  - 7.7.4 optimizing equipment layouts to meet OSHA standards, correct noise problems, reduce congestion, improve material flow, and utilize improved material handling techniques.



- 7.7.4.1 Revise process flow diagrams and identify on flow diagrams the proposed material handling methods.
- 7.7.4.2 Identify those operations or processes and equipment which should be relocated outside the existing Mint building.
- 7.8 Make layout drawings of proposed use of outside facilities and revise process flow diagrams.
  - 7.8.1 using one Butler building.
  - 7.8.2 using two Butler buildings.
  - 7.8.3 using new facility on site of existing Butler building.
  - 7.8.4 using new addition on west and south of Mint building.
  - 7.8.5 using 2nd floor south roof area.
  - 7.8.6 using potential off-site government facilities.
  - 7.8.7 any combination of the above.
- 7.9 Evaluate construction and preparation costs.
  - 7.9.1 to modify one Butler for production use.
  - 7.9.2 to modify two Butler buildings for production use.
  - 7.9.3 to replace Butler buildings with new facility for manufacturing operations.
  - 7.9.4 to provide addition to west and south side of Mint building.
  - 7.9.5 to enclose 2nd floor roof area for use.
  - 7.9.6 to utilize off-site government facilities.
  - 7.9.7 to utilize combinations of the above.
- 7.10 Evaluate annual operational costs, including costs of organizational staffing and security, to
  - 7.10.1 expand operations to one Butler building.
  - 7.10.2 expand operations to two Butler buildings.

- 7.10.3 expand operations to facility on site of Butler buildings.
- 7.10.4 expand operations to west-south extension to Mint building.
- 7.10.5 expand operations to second floor south roof area.
- 7.10.6 expand operations to off-site government facilities.
- 7.10.7 expand operations per 7.8.7
- 7.11 Review all concepts in detail.
  - 7.11.1 List deficiencies of each proposal.
  - 7.11.2 List specific advantages of each proposal.
  - 7.11.3 List cost comparisons and changeover problems expected to construct and prepare outside facilities.
  - 7.11.4 Make cost comparisons of outside facilities.
- 7.12 List specific changes recommended for optimum noise reduction.
- 7.13 List specific changes recommended to optimize ventilation.
- 7.14 List specific changes to reduce energy losses.
- 7.15 Prepare final report and identify the Denver Mints' final recommendations.



## 8.0 Investigative Action Assignments

<u>Action Item (para.) No.</u>	<u>Responsibility*</u>	<u>Sched. Compl. Date</u>
7.1	Lord, Billapando	6/9
7.2.1	Sjaardema, Billapando	6/9
7.2.2	Vaitaitis	6/9
7.3	Summers, Lord	5/19
7.3.1, 7.3.2	Summers, Lord	6/9
7.4	Sjaardema	5/19
7.5	Vaitaitis, Morgan Engineers	6/9
7.6	Sjaardema	8/4
7.7.1	Division Heads	6/9
7.7.2, 7.7.3	"	6/2
7.7.4.1	Engineers	6/9
7.7.4.2.	Project Committee	6/23
7.8.1, 7.8.2	Engineers	6/23
7.8.3	"	7/14
7.8.4	"	7/21
7.8.5	"	7/28
7.8.6	"	8/11
7.8.7	"	8/18
7.9.1	Sjaardema -	7/21
7.9.2	"	7/21
7.9.3	"	7/28
7.9.4	"	8/11
7.9.5	"	8/4
7.9.6	"	9/11
7.9.7	"	8/18
7.10.1	Project Committee & Cost Accounting Rep.	7/21
7.10.2, 7.10.3	"	7/21
7.10.4	"	8/1
7.10.5	"	8/4
7.10.6	"	9/1
7.10.7	"	8/18
7.11	Project Committee	9/8
7.12	"	6/23
7.13	"	7/21
7.14	"	7/21
7.15	Vaitaitis, Sjaardema	9/22

\* includes coordination of required drafting

Project Committee: Lawrence  
Darlington  
Summers  
Sjaardema  
Lord  
Neal  
Vaitaitis

TABLE I

ESTIMATED EQUIPMENT CAPACITIES/DAY

Estimates are based on actual production records. Blanking figures are shown for 15" and 12" bronze strip, and 12" strip for all other denominations

PROCESS	1¢	5¢	10¢	25¢	50¢	\$1.00
<u>BLANKING</u>						
Bliss HP2-100						
(15") carbide die	4,700,000					
(15") steel die	6,000,000	2,900,000	5,000,000	2,500,000	1,700,000	1,100,000
Bliss HP2-45						
(12") steel die	5,000,000					
<u>ANNEALING</u>						
4,000 lbs/hr line	13,200,000	5,200,000	16,000,000	5,700,000	3,000,000	1,440,000
2,000 lbs/hr line	4,500,000	2,000,000	4,800,000	1,900,000	840,000	400,000
<u>UPSETTING</u>						
Auto-Feed	7,350,000	4,550,000	5,000,000	3,300,000		
Hand-Feed					1,500,000	840,000
<u>STAMPING</u>						
100-ton Columbia	579,000				235,000	210,000
Bliss 6K-200	579,000	482,000	579,000	309,000		
Bliss 6K-225	579,000	482,000	579,000	309,000		
100-ton Standard	3,380,000	260,000	313,000	154,000		
<u>COUNTING</u>						
1 Stand (2 double counter)	4,400,000	3,600,000	2,800,000	1,920,000	1,200,000	680,000
Abbott Electronic	4,400,000					

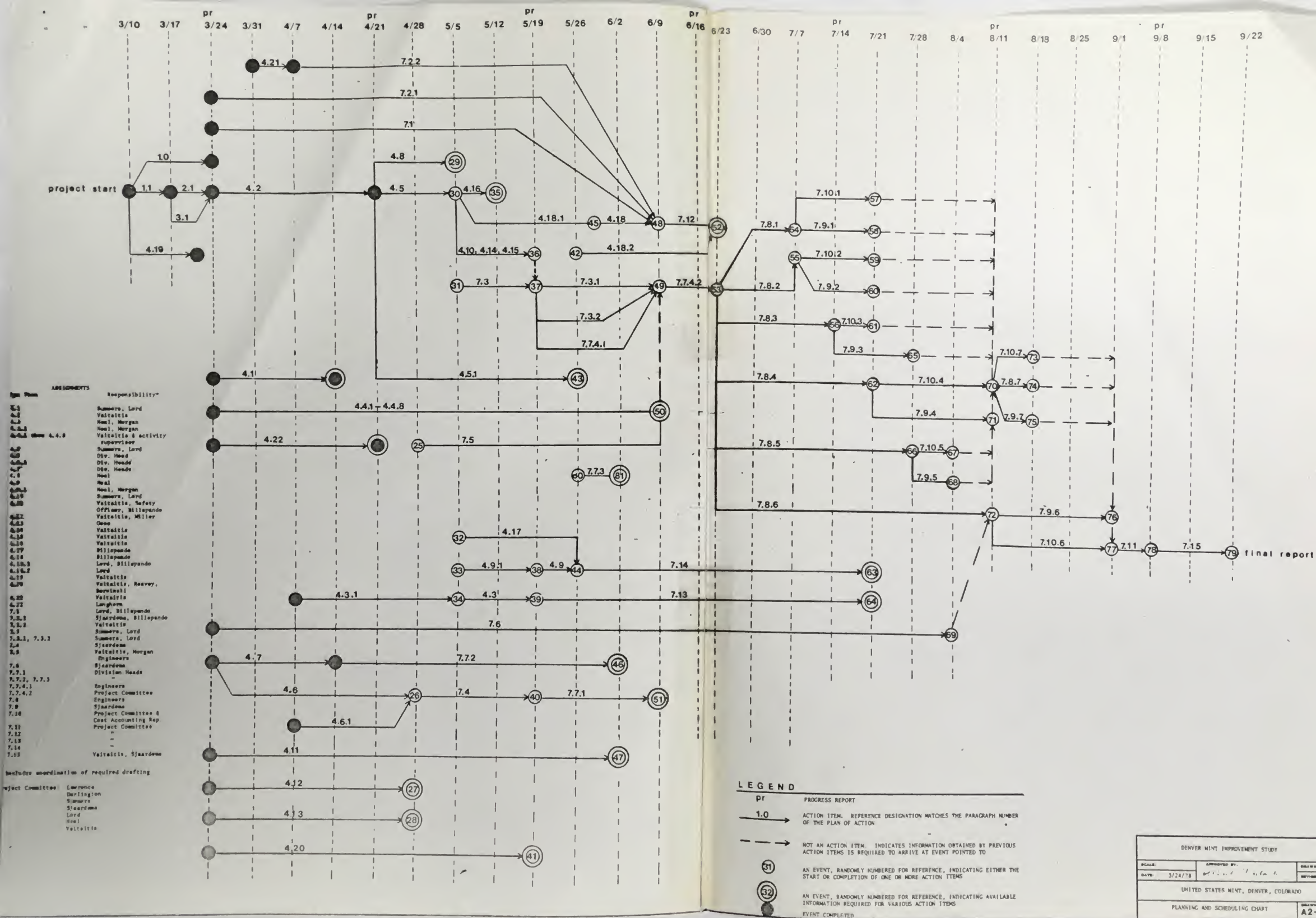
TABLE II

ESTIMATED EQUIPMENT REQUIREMENTS FOR 1985  
(Denver 1¢ blanking requirement based on 15" strip, carbide dies)

EQUIPMENT TYPE	AVERAGE DAILY PRODUCTION REQUIREMENT							TOTAL EQUIPMENT	
	1¢ (SFAO)	1¢ (DENV)	5¢	10¢	25¢	50¢	\$1.00	REQ'D	ON HAND
	7,500,000	21,375,000	2,567,000	3,483,000	3,300,000	550,000	250,000		
<u>BLANKING</u>									
Bliss HP2-100		4.55	.89	.70	1.32	.32	.23	8.01	8
Bliss HP2-45	1.5							1.5	2
<u>ANNEALING</u>									
4000 lbs/hr line		1.33	.50	.22	.58	.19	.18	3.0	3*
2000 lbs/hr line		.85						.85	2
<u>UPSETTING</u>									
Auto-Feed		2.91	.57	.70	1.00			5.18	8
Hand-Feed						.37	.30	.67	1
<u>STAMPING</u>									
Bliss 6K-200 & 225		19.97	5.33	6.02	10.68			.42	42
100-ton Columbia		7.47				2.34	1.19	11	11
100-ton Standard		16.24						16.24	24
<u>COUNTING</u>									
Stand		3.86	.72	1.25	1.72	.46	.37	8.38	9
Abbott Electronic		1.0						1.0	1

\* three (3) on-line, 1 spare (not installed)





April 25, 1978

Mrs. Stella B. Hackel  
Director of the Mint  
Bureau of the Mint  
Washington, D.C. 20220

Attn: Mr. George Ambrose

Dear Mrs. Hackel:

Enclosed is our second progress report for the Denver Mint Improvement Study and trip report for Al Vaitaitis' visit to the Winnepeg Mint and the Philadelphia Mint.

Sincerely,

Evelyn T. Davidson  
Superintendent

AV

Superintendent  
Deputy Superintendent  
B&M Files.



PROGRESS REPORT - APRIL 21, 1978  
DENVER MINT IMPROVEMENT STUDY

This is our scheduled progress report on the Denver Mint Improvement Study. A revised Plan of Action and the Planning and Scheduling Chart are also included.

After a somewhat slow start, the project is basically proceeding quite well and on schedule. As normally is the case, it took some time for the individuals involved to start thinking and acting as members of a team. Daily informal communication and the feeling of responsibility has improved the attitude toward the project tremendously.

We were not able to start the drafting effort (activity 4.2) on time as planned, because the draftsman, Mr. Tom Cawley, came on board only on 4/3/78, one week late. Additionally, he had to attend a previously scheduled 3-day EEO training course. This basic phase of drafting effort thus slipped by two weeks, and was completed on 4/21/78. Fifteen D-size (24" x 36") drawings of up-to-date floor plans were produced.

The drafting effort delay, however, did not affect the overall project time, although, as shown on the revised Planning and Scheduling Chart, the completion of some activities (4.10, 4.14, 4.15), basically having to do with existing equipment layouts and existing material and process flows, was delayed by two weeks. One very important date, 6/9/78, bringing us to the point of decision to identify those operations or processes and equipment which should be relocated outside the existing Mint building, remains as originally scheduled.

We are quite confident at this time that the start of the series of activities (7.8, 7.9, 7.10), the consideration of expansion to off-site or on-site facilities, will take place earlier than originally scheduled. Our revised chart shows this date now being 6.23/78 instead of 7/14/78, a 3-week gain. We feel it would be a little premature at this time to predict an earlier completion of the whole project.

We can comment as follows on individual activities that were due to be completed or in which we are actively involved at this time. Please refer to the up-dated chart.

Activity 4.2- - Trip by Al Vaitaitis to Winnepeg and Philadelphia Mints, - see attached Trip Report.

Activity 7.2.2 - Noise reduction for feed finger assembly. We are aware of the progress being made by Mr. Smith in Philadelphia, and are awaiting the results.

Activity 7.2.1 - Enclosure of feeder bowl assembly on coining presses. Having learned what seems to be a good solution from the Philadelphia Mint, we are proceeding with our first installation on a Bliss 6K-225 press (press TB-1). The first enclosure should be completed on or before 4/25/78 and will be evaluated prior to proceeding with the remainder of the presses.

Activity 7.1 - Punch press enclosure for noise reduction. The frame work was completed by a subcontractor on 4/3/78.



We are presently awaiting the arrival of the accoustical material, which was promised to be shipped this week. Installation of the accoustical material will be done by our B&M division and should take about 2-3 weeks to complete. The accoustical material actually would have been received much earlier, had not placing of the order been delayed one month in the procurement process. Two photographs, partially showing the framework around Punch Press No. 4, are included.

Activity 4.2 - Basic drafting effort, - progress of this activity was discussed earlier in this report.

Activity 4.1 - Production capacities. This activity is completed. The data is submitted with this report - see Tables I and II.

Activities 4.4.1 thru 4.4.8 - Optimum equipment spacing and arrangement. We realized that these activities cannot be studied by themselves, since the optimum equipment spacing and arrangement will depend to a certain degree on the noise problem solutions, and especially on automation. Some work is going on presently, but the scheduled completion date had to be changed.

Activity 4.22 - Impact of pellatized coin shipping. Although not previously shown as such, this activity was done. It was added to our action plan for record purposes.

Activity 4.3.1 - Measurements of air flow in the existing ventilation system. Our original schedule called for preparation of the existing ventilation drawings (activity 4.3) first, followed by air flow measurements (activity 4.3.1). Due to earlier discussed drafting delay, the two acitivities were reversed. We also gained a better feel for the required time, and revised the schedule accordingly.

Activity 7.6 Availability of off-site government facilities. Contacts have been made with Lowry Air Force Base, Buckley Naval Base, Fitzsimons Army Medical Center, the Real Estate Office of the Corps of Engineers, and the Rocky Mountain Arsenal regarding the availability of facilities suitable for production and/or warehouse activities. The Rocky Mountain Arsenal apparently has the only potential space available. It has been difficult to get firm data and any type of commitment on the facilities available at the Arsenal but efforts are continuing in this regard.

Activity 4.7 Visitors tour routes. Proposed revisions and improvement of the tour route have been finalized with the concurrence of the Director, Ms. Hackel. Detailed cost estimates are being prepared for these changes.

Activity 4.6 Office layout review. Office layouts have been reviewed and several office relocations have been adopted by

management. Detailed cost estimates are being prepared on construction required for these changes.

Activity 4.6.1 Some organizational changes have been discussed and finalized as a consideration in Activity 4.6.

Activity 4.11 List of OSHA non-compliance. The list is partially complete. We are taking steps to obtain an up-to-date estimate on the cost of up-dating the Standard presses to OSHA requirements. As this will take 4 to 5 weeks, the completion date of this activity was rescheduled.

Activity 4.12 Compressed air, steam and water piping deficiencies. We find that quite a bit of problems exist in the original part of the Denver Mint as far as piping is concerned. The activity is about 80% complete.

Activity 4.20 Security and fire protection systems. Very little was done on this area due to shortage of personnel. Since the completion of this item does not directly affect any following activities in the immediate future, a new completion date was established.

Activities 4.9, 4.9.1 The new Action Oriented Energy Management Plan has added far more complexity to this activity than originally planned. The proposed Energy Management Plan requires a more detailed analysis and approaches the problem from a different perspective than perceived in planning an energy study. The demand on our time and effort to effectively meet the task assignments of the Energy Management Plan may have a delaying effect on some activities of the Denver Mint Improvement Study since the expertise of many of the same people is involved. It appears to be a practical impossibility from a front-end perspective to do justice to the requirements the energy survey within the imposed time limits, however, our initial approach is to make the energy survey our prime priority and see what is accomplished by the deadline date of May 19, 1978.





# DEPARTMENT OF THE TREASURY

WASHINGTON, D.C. 20220

OFFICE OF  
DIRECTOR OF THE MINT

MAY 5 1978

RECEIVED

MAY 8 1978

Mrs. Evelyn T. Davidson  
Superintendent  
United States Mint  
320 W. Colfax Street  
Denver, CO 80204

OFFICE OF  
SUPERINTENDENT  
U. S. MINT AT DENVER

Dear Mrs. Davidson:

A review of your second progress report on the Denver Mint Improvement/Expansion Study--for the period ending April 21, 1978--has been completed. We have also reviewed Mr. Vaitaitis' report of his visit to the Winnipeg and Philadelphia Mints.

Need for your rearranging the sequence and time required for completion of certain activities in the study is understood. It is noted also that even though such reprogramming was necessary, your overall progress is as originally expected and the project completion date remains as originally scheduled.

1. Two important milepost dates are identified in your report--June 9-23: The identification of operations/processes and thus equipment which are proposed to be located outside the existing (main) Mint building and; June 23-August 11: Study the several alternatives for expanding on-site or use of off-site surplus government facilities to support increased production capacity.

The extent to which additional production capacity is finally planned exterior to the existing Mint building is one of the most important decisions to result from the Improvement Study. This decision will be a direct function of existing equipment capacities used in the study. We must therefore more fully address TABLES I and II (Estimated Equipment Capacities/day) of your report.

## BLANKING

Blanking press capacities outlined in TABLE I for 1-cent strip utilizing carbide and steel dies on 15-inch strip indicates a 28% greater productivity using steel over carbide dies. This level of productivity on carbide die sets is unacceptable and emphasizes the

orig: Al Vantauten

Dean S. ...

Jim. ...

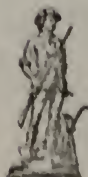
Barney ...

Jack ...

Wm. ...

Harry ...

Keep Freedom in Your Future With U.S. Savings Bonds



need to determine what action must be taken to upgrade the use and maintenance of Denver Mint carbide die sets so that expected productivity output can be obtained. This subject was addressed in Mr. A. Vaitaitis' Philadelphia Mint trip report. Please outline a plan for investigating and subsequently correcting deficiencies in the design/use/maintenance of your carbide die sets. In the meantime, it is suggested your study project the need for blanking press equipment in 1985 for 1-cent production on the basis of use of carbide die sets with a productivity output at least equal to that for steel die sets.

It is noted that the processing of 12-inch wide 5-cent strip through 1985 was assumed. You can expect to continue to receive 13 11/16" wide 5-cent strip through 1985 which will increase the productivity per press by 13 percent.

Continued use of the two 45-ton blanking presses, operating on 12-inch wide 1-cent strip, through 1985 is implied in TABLE II. Bear in mind that 15-inch wide 1-cent strip will be available for total quantities we need in CY 1985, and such strip width and associated increased weight of coils provides a 20% greater productivity output in blanking.

#### ANNEALING

It is not apparent why the capacity of the 2,000#/hr furnace is indicated as being from 25 to 40 percent that of the 4,000#/hr furnace.

2. One important element to be included in the Improvement Study is the volume of in-process material to be stored, and the areas and method of storage; and, the volume to be moved between processes and method of movement. No doubt you are giving this item adequate consideration; however, no action item specifically related to this task can be identified in the study outline.

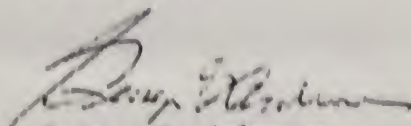
3. Your comments relating to the recently imposed development of an energy management plan, and the level of effort required to complete the energy survey, are appropriate. It is emphasized that effort should be concentrated on the noncapital portion for the May 19, 1978 reporting date, realizing that additional effort will be required to complete the capital projects portion of the survey. It is hoped the required energy survey will not significantly delay completion of the study project.



Due to the importance of the decisions to be made, during the period June 9 through June 23, on operations/processes proposed to be accomplished outside the existing Mint building, it is suggested your June progress report be rescheduled to cover the period May 19 through June 23 in lieu of the period May 19 through June 16 as now planned.

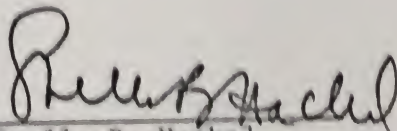
We look forward to your next (May 19) progress report on the Denver Mint Improvement Study.

Sincerely,



George G. Ambrose  
Assistant Director of the Mint  
for Production

Approved:



Stella B. Hackel  
Director of the Mint



OFFICE OF  
SUPERINTENDENT

# THE DEPARTMENT OF THE TREASURY

UNITED STATES MINT

DENVER, COLO. 80204

May 19, 1978

Mrs. Stella B. Hackel  
Director of the Mint  
Department of the Treasury  
501 13th Street, N.W.  
Washington, D.C. 20220

Attn: George Ambrose

Subject: Progress Report  
Denver Mint  
Improvement Study

Dear Mrs. Hackel:

We felt there was no need at this time to retype the Plan of Action. Following hand corrections should be made to reflect one previously omitted activity, and three newly added activities in Section 4 of the Action Plan.

Add para. 4.5.1 to read: "Show existing B&M Division equipment layout."

Add para. 4.12.1 to read: "Identify electrical deficiencies in view of new production configuration for 1985."

Add para. 4.13.1 to read: "Identify air, steam and water piping deficiencies in view of the new production configuration for 1985."

Add para. 4.20.1 to read: "Prepare drawings for existing security and fire alarm systems."

Our progress on activities that were due to be completed or in which we are actively engaged at this time is as follows.

Activity 7.2.2 - Investigate noise reduction for feed finger assembly. As stated in our last progress report, we were following



the progress of Mr. Smith in Philadelphia on this activity. We received an informal report that the noise reduction results in Philadelphia turned out to be insignificant. We are not presently undertaking any new action on this effort.

Activity 7.2.1 - Enclose feed tank/feeder bowl assembly. Our first installation on a Bliss 6K-225 press was completed 4/24/75. The installed curtain reduced the noise level from 97dbA to 86dbA. We have since enclosed three additional coining presses, and will start the work on the fifth on 5/22. This will consume most of the materials on hand. Additional material is scheduled to be delivered on May 25, 1978.

Activity 7.1 - Punch press enclosure for noise reduction. The completion of this effort is within a few days. We assume that the noise reduction results will be available by 5/26/78.

Activity 4.8 - Identify floor load limits on layout drawings. This activity was completed as scheduled.

Activity 4.5 - Existing production equipment layout drawings were completed.

Activity 4.16 - Identification of "wasted" space. We find that there is no wasted space in any of the production areas. In fact, the space, as a rule, is "overused", and this is our primary problem. We foresee some better utilization of an electrical spare parts/motors storage area on the third floor. This would not, however, increase space available for production.

Activity 4.18.1 - Measurement of noise levels throughout the plant. This effort is on time, and perhaps a little ahead of schedule.

Activities 4.10, 4.14, 4.15 - Drawings showing material flow and material handling methods are completed, except for minor things such as identification of various process areas, offices, etc. Identification of areas of double handling and cross-flow of materials as such was not done; however, these problems (double handling and cross-flow of materials) are evident by just looking at the material flow diagrams. We question the need to formalize this information in any other way, and consider these activities completed. A set of drawings is included for your information.

As a part of the identification of material handling methods, we took a look at the annual costs of the forklift truck and elevator operations. The cost breakdowns and summaries are enclosed with this report for your information.

Activity 7.3 - Investigation of (better) potential layouts of equipment in existing facility. For all practical purposes nothing has been done to date.

Activity 4.5.1 - Show existing B&M Division equipment layout. We depended on B&M division foremen for inputs to drafting. This effort is lagging, and may not be finished as scheduled.

Activities 4.4.1 - 4.4.8 and 7.5 - Optimum equipment layouts and investigation of automation. No progress so far, mainly because of the recently added effort for the Energy Management Plan.

Activity 4.17 - Identification of areas of uncomfortable temperatures. Although nothing was done, this is a very small effort, and it will be completed on time.

Activity 4.9.1 - Measurement of energy losses. We obtained more information on this item than originally planned while collecting data for the Energy Management Plan. The Energy Management Plan report was transmitted to you on 5/17/78.

Activities 4.3.1, 4.3 - Existing ventilation data and drawings. The deadline was met.

Activity 7.6 - Investigation of off-site facilities. As previously reported, the only sites potentially available are at the Rocky Mountain Arsenal. Our attempts to obtain site plans and building elevation and floor plan drawings have been unsuccessful to date.

Activity 7.7.2 - Layout drawings for improved tourist routes. The tourist route has been sketched out on and approved by the Director. We are awaiting approval of the cost estimates before proceeding further.

Activity 4.6 - Office layout review. Preliminary sketches of office layouts have been approved by the Superintendent and the director. We are holding on this activity also until cost estimates are approved.

Activity 4.6.1-Organizational structure review. The organizational structure was reviewed concurrent with review of office space requirements. Some reorganization is proposed for the future but there is sufficient flexibility in the proposed office layouts to handle these changes without significantly affecting space utilization.



Activity 7.4 - Evaluation of existing organizational structure and projection of changes thru 1985. We realized that this effort relates very much to the outcome of the whole study, and any projected changes in organizational structure relating to potential production process relocations can best be addressed later. The Planning and Scheduling Chart was revised to show this effort due 8/11/78.

Activity 7.7.1 - Optimum layout of office space to meet 1985 projections. As in the case of activity 7.4, this effort was also rescheduled to 8/11/78.

Activity 4.11 - List of OSHA non-compliance. Progress satisfactory.

Activity 4.12 - Electrical deficiencies. This effort was completed. However, more deficiencies may become evident if the production equipment layout changes. We established a new activity 4.12.1 towards the end of the project.

Activity 4.13 - Air, steam and water piping deficiencies. As in the case of activity 4.12, we foresee a need to take another look at this area later in the study, and activity 4.13.1 was established.

Activity 4.20 - Identification of Security and Fire Protection systems. Collection of data was completed. We are going to prepare a series of drawings to formalize the existing configurations of the systems by new activity 4.20.1. Our biggest problem up to now was the maintenance of these systems due to the fact that many of the components are no longer available, or are available only at a very high cost. We are hoping that a transfer of surplus parts and equipment from the Philadelphia Mint to the Denver Mint will be carried out, putting us in a much better position for system maintenance. A formal request for the surplus equipment transfer from Philadelphia was initiated by our Accounting Division.

The estimated equipment capacities and the equipment requirement Tables I and II were revised. We had a lengthy discussion concerning the utilization of the two 45-ton punch presses, and decided not to schedule any production for these presses in Table II. Our feeling is that by 1985 these two machines would have to be replaced. The revised Table II shows that we can almost accomplish the 1985 demand for blanks with the eight (8) 100-ton presses.

As already mentioned in this report earlier, we made little progress on activities 7.3 (investigation of potential layout of equipment in existing facility), 4.41-4.4.8 (determination of optimum equipment spacing and arrangement), and 7.5 (potential for automation).

Subject: Progress Report  
Denver Mint Improvement Study

Page 5

Two of our engineers, Al Vaitaitis and Dick Lord, will be attending the Industrial Noise Control workshop during the week of May 22 thru May 26, and we are quite busy with the preparation for our annual shut-down.

As a consequence, we feel that the completion date of 6/23/78 for activity 7.7.4.2 (decision as to what operations or processes should be relocated outside the main building) may not be realistic, and that a new probable completion date will most likely be 7/7/78. The Planning and Scheduling Chart still shows the 6/23 for a decision of 7.7.4.2., as well as the date of 6/16 for our next progress report. Changing the completion date of 7.7.4.2 to 7/7/78 includes a period of two weeks during the shutdown, providing us with an opportunity to sit down and concentrate without constant interruptions that are inherent in any manufacturing operation.

Your comments concerning the need to consider the volume of in-process material to be stored and handled, as well as all other detailed observations are appreciated. They provide us with an opportunity to review our actions as we progress, and positively affect this study.

The enclosed photographs show the partially enclosed punch press and typical feeder bowl sound enclosures on coining presses.

Sincerely,

Harry E. Lawrence  
Acting Superintendent



TABLE I

## ESTIMATED EQUIPMENT CAPACITIES/DAY

Estimates are based on actual production records. Blanking figures are shown for 15" bronze strip, 13 11/16" nickel strip, 12" strip for all other denominations. Blanking capabilities for 1¢ blanks with carbide dies are assumed.

Revised 5/16/78

PROCESS	1¢	5¢	10¢	25¢	50¢	\$1.00
<u>BLANKING</u>						
Bliss HP2-100 (15") carbide die	6,000,000					
(15") steel die	6,000,000	3,300,000	5,000,000	2,500,000	1,700,000	1,100,000
Bliss HP2-45 (12") steel die (standby)			4,500,000			
<u>ANNEALING</u>						
4,000 lbs/hr line	13,200,000	5,200,000	16,000,000	5,700,000	3,000,000	1,440,000
2,000 lbs/hr line	4,500,000	2,000,000	4,800,000	1,900,000	840,000	400,000
<u>UPSETTING</u>						
Auto-Feed	7,350,000	4,550,000	5,000,000	3,300,000		
Hand-Feed					1,500,000	840,000
<u>STAMPING</u>						
100-ton Columbia	579,000				235,000	210,000
Bliss 6K-200	579,000	482,000	579,000	309,000		
Bliss 6K-225	579,000	482,000	579,000	309,000		
100-ton Standard	338,000	260,000	313,000	154,000		
<u>COUNTING</u>						
1 Stand (2 double counter)	4,400,000	3,600,000	2,800,000	1,920,000	1,200,000	680,000
Abbott Electronic	4,400,000					



TABLE II

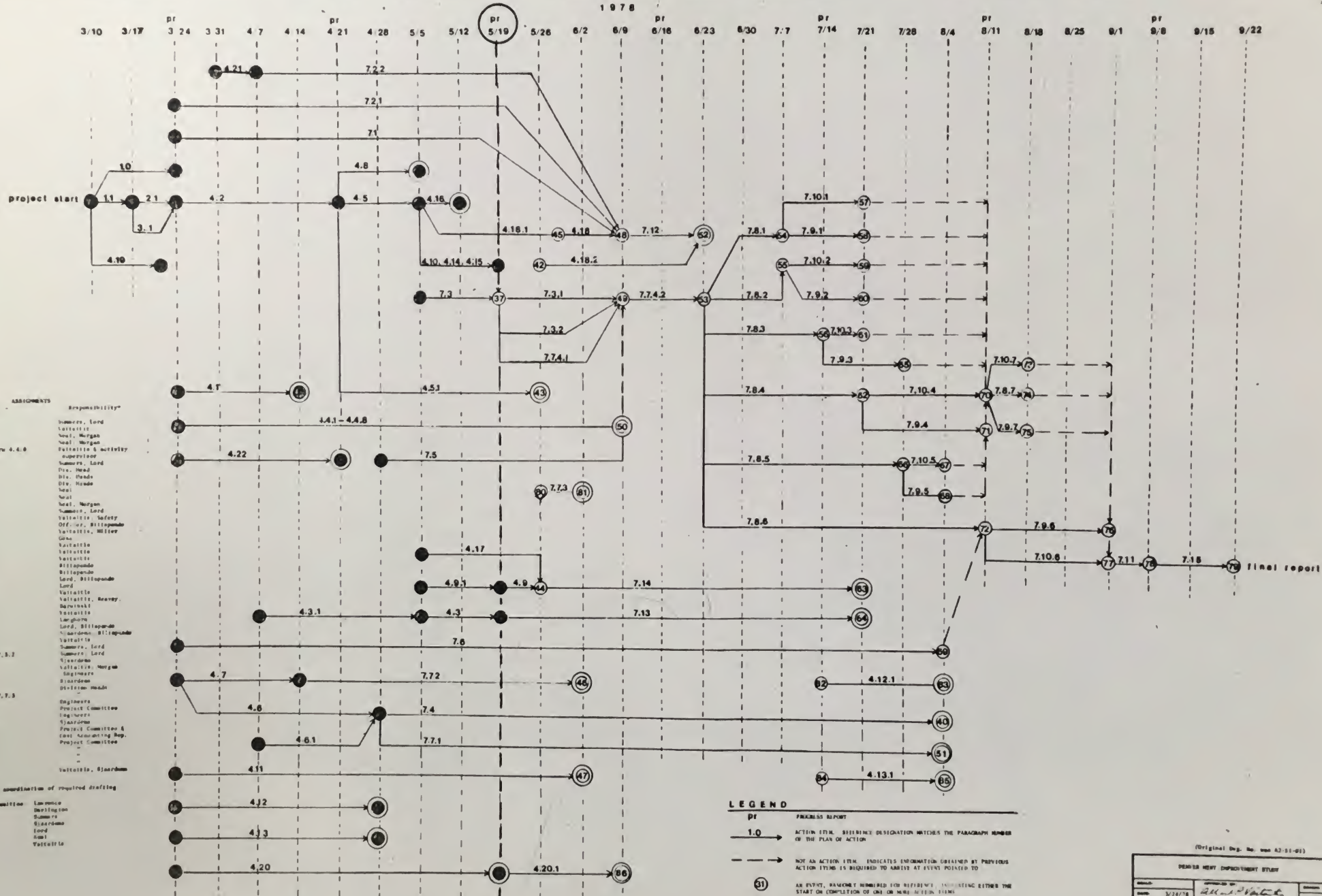
ESTIMATED EQUIPMENT REQUIREMENTS FOR 1985  
(All 1¢ blanking requirement based on 15" strip, carbide dies)

Revised 5/16/78

EQUIPMENT TYPE	AVERAGE DAILY PRODUCTION REQUIREMENT							TOTAL EQUIPMENT	
	1¢ (SFAO)	1¢ (DENV)	5¢	10¢	25¢	50¢	\$1.00	REQ'D	ON HAND
	7,500,000	21,375,000	2,567,000	3,483,000	3,300,000	550,000	250,000		
<u>BLANKING</u>									
Bliss HP2-100	1.25	3.57	.78	.70	1.32	.33	.23	8.18	8
Bliss HP2-45									2
									(Standby)
<u>ANNEALING</u>									
4000 lbs/hr line		1.33	.50	.22	.58	.19	.18	3.0	3*
2000 lbs/hr line		.85						.85	2
<u>UPSETTING</u>									
Auto-Feed		2.91	.57	.70	1.00			5.18	8
Hand-Feed						.37	.30	.67	1
<u>STAMPING</u>									
Bliss 6K-200 & 225		19.97	5.33	6.02	10.68			42.0	42
100-ton Columbia		7.47				2.34	1.19	11.0	11
100-ton Standard		16.24						16.24	24
<u>COUNTING</u>									
Stand		3.86	.72	1.25	1.72	.46	.37	8.38	9
Abbott Electronic		1.0						1.0	1

\* three (3) on-line, 1 spare (not installed)

1978



(Original Dg. No. was 42-11-01)

DESIGN REPORT IMPROVEMENT STUDY

Author	5/24/78	Reviewed by	APV
Date	5/19/78	Reviewed by	APV
UNITED STATES NUT, DENVER, COLORADO			
PLANNING AND SCHEDULING COURT			
D2-61-01			



## FORKLIFT TRUCKS

Denver Mint has

5 propane-powered lift trucks  
2 gasoline-powered lift trucks  
49 electric lift trucks

The cost of maintenance for electric trucks for fiscal year 1977 was:

labor	\$35,537.64
materials	<u>20,858.78</u>
	\$56,396.32

The maintenance labor cost (direct, no benefits), using an average cost of \$8.50/hr., represents 4,180 man-hours, which equals to approximately 2.15 full-time employees.

Twelve (12) forklift operators, two (2) leaders and three (3) foreman are employed. The approximate annual expense for salaries amount to \$242,500.

On the average, three trucks have to be purchased each year to replace the trucks that wear out. This cost is approximately \$50,000/year.

To summarize:

New trucks	\$ 50,000
Operation	242,500
Maintenance	<u>56,400</u>
Total annual cost	\$348,900

The above total cost does not include the maintenance of the seven(7) internal combustion (propane and gasoline) trucks, since the Accounting system does not have a separate account for this effort.

In addition to the total cost, the extensive use of forklift trucks create a variety of other problems such as:

Safety - the aisles are narrow and not straight. There is always a danger to human life, although we never have had a serious accident.

Damage to Equipment - there are numerous "accidents," usually not reported, involving the damage of doorways, walls, coining presses, electrical panels, and just about every kind of equipment.

Damage to Floors - sections of floor have to be refinished every year during Settlement and sometimes during the weekends.

Congestion - space is the most important problem in the Mint, and the trucks, mobile or at standstill, use space. We are running out of space in the battery charging area on the third floor also.



Housekeeping - the trucks travel throughout the whole building on all floors, pick up dirt in dirty areas and distribute it everywhere.

One other problem is the inability for us to purchase trucks that could serve us best (Allis-Chalmers brand is our favorite), due to procurement regulations. As a result, we have, for example, ten (10) different brands of electric trucks, creating mainly a problem for maintenance. While the maintenance cost is not prohibitive at all, there are times that it takes up to 3 months to obtain a part, which hurts the production.

ELEVATOR OPERATION COST  
FOR FISCAL YEAR 1977

Maintenance labor, direct	\$ 13,765.21
Materials	702.74
Overhead	23,559.64
Net Obligation (contract work)	<u>9,896.08</u>
Total	\$ 47,923.67





# DEPARTMENT OF THE TREASURY

WASHINGTON, D.C. 20220

OFFICE OF  
DIRECTOR OF THE MINT

JUN 1 1978

RECEIVED

JUN 5 1978

OFFICE OF  
SUPERINTENDENT  
U. S. MINT AT DENVER

Mrs. Evelyn T. Davidson  
Superintendent  
United States Mint  
320 W. Colfax Street  
Denver, CO 80204

Dear Mrs. Davidson:

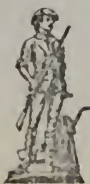
Your Denver Mint Improvement/Expansion Study progress report for period ending May 19, 1978 has been received. It is noted that you are nearing completion of the data gathering phase (Series 4) and are well into the all important investigative phase (Series 7) of the study.

You indicated you will have soon completed enclosures of the tank/feeder bowl assembly on 5 coin presses and that additional presses will be completed after receipt of more material, due May 25. Please provide us with an estimate for completion of this project in your next progress report. We are also anxious to know the results of noise reduction enclosure on the blanking press. Please advise the results of this effort as soon as you can.

With regard to your report on activity 4.16---Identification of "wasted" space---the following comments are offered. One important consideration in use of production areas is the determination of appropriate (minimum) quantities of in-process materials to be stored. Improper balance of such materials between the several processes---in fact the unbalancing of production processes one to another---often results in improper and ineffective allocation of production spaces in meeting production objectives.

The problems in double handling and cross-flow of materials are evident by looking at the flow diagrams, as you suggest. The most congested passageway is the aisle in the main press room---between count/review and the center elevator and the coin pallet shipping dock. This appears to lend need to select a better location for the count/review operation.

orig: Al Vartantis  
copy: Duane Strickland  
Barney Hest  
Dick Galt  
Harry Lawrence  
Jim Darlington  
Jim Summers



Keep Freedom in Your Future With U.S. Savings Bonds

We are returning the color-coded work sheets on material flow/ material handling methods which were inadvertently transmitted to us. You should retain for reference, from which your finished drawings were made.

You have provided us with cost estimates on the improved tourist route (except the sales room and the display vault) and on related revised office layouts. The cost estimates are being reviewed and the Director's decision will be forthcoming in the near future.

We see no problem in effecting the transfer of needed surplus parts and equipment for your security system from the Philadelphia Mint.

As your study progresses, give consideration to a production alternative used in past practice but not currently in effect in the Mint. This involves the cycling of production on four denomination of coins, two every three months, while sustaining production of cent and quarter coins on a continued basis. This idea was abandoned in the Denver Mint in order to effect maximum shipment of coins direct from count and review without placing in storage spaces. Use of FRB pallets for storage and shipment of all coins would favor this production concept.

You should give consideration to utilizing one of the Butler type buildings for storage of subsidiary coins and increase the use of RMA Building 362 for the storage of cent coins. This storage plan is attractive in the interest of storing and shipping dimes through dollars on steel FRB coin pallets.

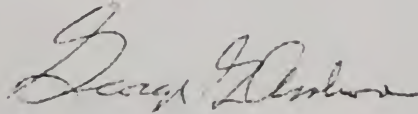
Your May 19 letter indicates the decision as to which operations/ processes are to be recommended for relocation exterior to the main building will be made during the week ending July 7, 1978. Current plans are for a representative of the Office for Production to be at the Denver Mint on July 5, 6, and 7 to meet with Mr. Vaitaitis and your Project Committee during the period of discussion and formulation of recommendations on this phase of the project.

Based upon your rescheduling activity 7.7.4.2 (above) for completion on July 7 versus June 23, it is anticipated your next



progress report will cover the period ending June 16 as opposed to June 23 as we had suggested in our May 5 letter.

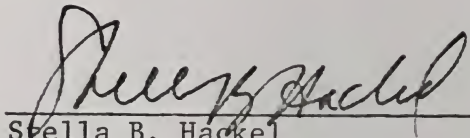
Sincerely,



George G. Ambrose  
Assistant Director of the Mint  
for Production

Enclosure

Approved



Stella B. Hackel  
Director of the Mint



OFFICE OF  
SUPERINTENDENT

# THE DEPARTMENT OF THE TREASURY

UNITED STATES MINT  
DENVER, COLO. 80204

June 20, 1978

Mrs. Stella B. Hackel  
Director of the Mint  
Bureau of the Mint  
Washington, D.C. 20220

Attn: Mr. George Ambrose

Dear Mrs. Hackel:

Enclosed is our June 16th progress report for the Denver  
Mint Improvement Study.

Sincerely,

Evelyn T. Davidson  
Superintendent

AV

Superintendent  
Deputy Superintendent  
B&M Files



DENVER MINT IMPROVEMENT STUDY  
PROGRESS REPORT

June 19, 1978

We start by responding to your letter of June 1, in which our May 19 progress report is discussed.

The accoustical material that was due to arrive on May 25 did not get in on time. Additionally, only one item (the barrier) was received. The second item (the dampener) was only received on June 16. We completed three additional installations, and have been waiting for the dampening material. We do not plan to do any new enclosure installations until after the shutdown period. A schedule for this work starting on the week of July 2 is included for your information.

In regard to "wasted" space and determination of approximate quantities of in-process materials to be stored, Table III (enclosed) was developed as a starting point. The required storage areas are not included, since much depends on the floor strengths, stacking of tanks, etc.

Your observation of the congested passageway in the main press room between the count/review and the center elevator is obvious to us also. However, instead of relocating the count/review, we visualize a solution by possibly utilizing Vault "O" as a temporary storage/transition area, and connecting this vault directly to the west dock by some kind of passageway or a conveyor line. This, of course, is only one of many possibilities.

The subject of storing subsidiary coin in one of the Butler buildings was extensively discussed in a meeting on June 16. The existing security level would not be adequate; capital investment would be required to improve the security level. The discussion then switched to the policy of storing coin in general, and the quantity of subsidiary and minor coin to be stored by 1985, in specific. Even though we understand that a 9-month supply of subsidiary coin and a 90 day supply of minor coin should be stored, it was felt that this is not a firm policy. It is not listed, for example, in the conditions and restrictions in the action plan of our study. A clarification of this subject, it was felt, should be one of the items on the agenda during the visit of the Bureau of the Mint representatives in July. July 7th would be the best day to discuss this item, since all Denver Mint interested parties would be present that day.

Following is the status of activities in reference to the progress report date on the Planning and Scheduling Chart.

7.2.1 - Enclsoure of the feeder bowl assembly. THis activity was discussed and covered at the beginning of the report.

7.1 - Punch press enclosure. The noise reduction results of the enclosure were already discussed briefly in Mr. Vaitaitis' report on Industrial Noise Control Workshop, sent to you earlier. Reviewing this project in more detail for record purposes seems to be in order.



While the sound tests were performed on punch press #4, noise levels were taken in various locations around the press. A location 4 feet away from the edge of the die set in front of the press was found to be the noisiest spot. This spot is also the location where the operator has to be to either observe the operation of the dies (if the die was not enclosed), or to check the outcoming blanks.

Test #1, without the enclosure, established this point to have a reading of 102dbA. A background noise, with other punch presses idling, was observed to be 87 dbA.

Test #2, with the enclosure completed (except for the top, which was left completely open), and otherwise under the same conditions, produced a reading of 92 dbA. The mathematical calculation showed that the true noise reduction as a result of the enclosure was 11.5 dbA.

Test #3 was performed on June 6, during a shift change, at which time all the punch presses, south press room coin presses, and also the exhaust fans were shut off. The compressed air to the other 7 presses was also shut off. The compressed air was left "on" on #4 press the press otherwise being "dead". The background noise under these conditions was recorded to be 72.5 dbA. Shutting off the air on #4 press reduced the noise level to 62 dbA. Test #3 was performed at this time with all enclosure doors open. The reading was 101.8 dbA.

Test #4 reading, with the enclosure in place, was 91.5 dbA. This test, with a reduced background noise, confirmed the results of Test #2.

Test #5 was performed during a shift change on June 15. 75% of the top area was covered with basically the same material as the rest of the enclosure. There was no noticeable noise reduction at the point of concern. A 1 dbA reduction of noise was recorded about 20 feet from the press near the coil reel, where the operator spends most of his time.

Test #6, following Test #5, was done with the top of the press completely covered. Again, no noticeable reduction of noise could be observed at the test point in front of the press. The point 20 feet away from the press (the same point as in Test #5) now recorded an additional 1 dbA reduction.

Tests #5 and #6 were performed with the knowledge that in actual operation the top enclosure would create a rapid rise in temperature, which could not be tolerated. In fact, even the 75% top enclosure created a temperature rise that cannot be tolerated. Lately, with the outside temperatures in the 80's and 90's, it was observed that the chopper is overheating, and the top enclosure from the chopper had to be removed.



To summarize: the punch press enclosure, with the top open, reduces the noise by 11.5 dbA. However, temperature problems exist, requiring forced ventilation. We are in no position to say that we have a solution at this time. Enclosing the top produces diminishing returns. It seems that instead of enclosing the top (unless doing so would help forced ventilation), ceiling and/or wall treatment would result in same or better results, if we come to the point of "fighting" an additional dbA.

As we have observed earlier, we know that the hissing of compressed air thru the punches of a die contributes to a certain extent to the overall noise level. This contribution may not be significant. We are presently awaiting for a few free samples of what a manufacturer (Allied Witan Co., Cleveland, Ohio) calls "air ejector collimator muffler" (see Exhibit "B", enclosed). We intend to do some bench testing to find out if this "muffler" does a good job. Should it be the case, a further investigation, to see if this device could be incorporated into the die punch, would seem to be worthwhile.

The blank ejection system could also possibly be changed from the compressed air to a mechanical method by a spring loaded ejector rod, a system supposedly widely used in industry. The mechanical system would to some degree help to conserve energy (capacity of air compressors), since under the present system air is continuously being lost thru the punches.

In one of our earlier tests we measured the noise level of a 32-punch steel die 12" inches away from the edge of the die. The noise level was 109 dbA. Later this die set was removed for sharpening, and was ground as a stepped die. Our next test under identical conditions found the noise level of the stepped die to be only 99 dbA, a very significant reduction of approx. 10 dbA. It occurs to us that similar results could possibly be obtained if a carbide die could be ground to "stepped" configuration, however, stepping of carbide dies presents some technical problems not encountered with steel dies.

Experimentation with different die configurations is not exactly related to the punch enclosure. While we don't necessarily object to this endeavor, we believe that a central bureau-wide responsibility and coordination is needed to avoid any duplication of effort.

4.18.1, 4.18 - Noise level measurements throughout the plant and recording of same on drawings. This effort is presently being completed by the draftsman.

4.18.2 - Investigation of materials and methods for noise treatment of space. The progress in this area presently is limited to compiling reference literature/catalogs.



7.3, 7.3.1, 7.3.2 - Potential and improved equipment layouts and revised process flow. All of these activities were given adequate consideration. We are going to actually relocate the coil up-ender and the process weight scale during the shutdown period to improve the strip coil handling. Other ideas remain in the form of red-lined drawings, and do not provide any good overall solutions. These ideas eventually will be of help as we proceed with the study.

7.7.4.1, 7.7.4.2 - Optimized process flow diagrams and proposed material handling methods. These activities are not progressing satisfactory. Our efforts will be concentrated towards this effort the next two weeks.

4.5.1 - Existing B & M equipment layout. The Scale Shop and equipment under the jurisdiction of the Electrical Branch are not yet completed. Completion is anticipated shortly after the shutdown.

4.4.1, 4.4.8 - Determination of optimum equipment spacing and arrangement. Nothing was done concerning the equipment of the maintenance shops (4.4.7), since this is not our critical area. Improvements could be made if more space was available. As far as production equipment goes, - it has received consideration, but, in the final analysis, a theoretically ideal layout is not possible for everything. The optimum spacings and arrangements will crystalize, we assume, at the same time as we reach a decision as to which equipment/processes must be moved out of the existing building.

7.5 - Potential for automated handling of materials. A number of ideas are being considered. Some of these, in the area of process weigh, are shown in the enclosed Exhibit "A". We are also looking at conveyor systems other than bucket type.

The automated handling of materials implies more than just smooth material flow. We should develop an overall useful system, which would include material handling, in-process weigh, and automatic generation of statistical records for production and maintenance uses. We are forced, in this regard, to look at the latest advances in industry, and the concept of programmable controller (PC) becomes more and more inviting. The subject of PC was discussed over a year ago between Dr. Goldman and Al Vaitaitis, and subsequently a "memo" on the subject was sent to both the Office of Technology and the Office of Production. A copy of said communication is enclosed as Exhibit "C" with this report. In addition to the PC desirability in connection with the potential future automation, we see that it would be worthwhile to have it available at this time. We are presently in process of upgrading eleven (11) 6K-200 Bliss coin presses to OSHA requirements (one press was upgraded a few years ago). This project, among other things, requires a complete rewiring of the electrical control cabinet. We recently finished upgrading one press, with ten more to do. Our records show, that the direct labor cost for the electrical portion of this job (Work Request 612-D74) was \$3,172.10. Being very conservative, we estimate that at least 50% of this effort was spent on control wiring, which, if a PC were employed, could practically be eliminated. Some interconnection work between the PC and the individual press still remains.



Being very liberal, we estimate that this phase of work would take not more than 10% of the present control wiring effort, or 90% of the present initial labor cost could be saved. This saving thus would amount to about \$1,427.00/press, or a total of \$14,270.00 for the remaining 10 presses. A programmable controller of the size to handle 10 to 12 coining presses would probably cost about \$6,000.00 to \$8,000.00, and would pay for itself before the project is over.

There would be some expense on the training of electricians. A working knowledge with a PC can be achieved in about 16 hours of instruction. The programming of the overall larger systems would be done by our engineer or a trained engineering technician.

The PC concept especially lends itself to the situation where new control systems, such as controls of conveyors, are involved. Every new system requires a considerable amount of "debugging" and many changes. The electricians time normally required on the machine is practically eliminated when a PC is employed. This saving of labor cost is normally the main justification for a PC.

7.7.3 - Improving employee access to building. A temporary access thru the basement is presently being readied. The decision for a permanent entrance will follow at the conclusion of the study.

4.17 - Uncomfortable temperatures. This activity is completed, identifying the major problems as the south dock, the annealing area, and the melt room.

4.9.1, 4.9, 7.14 - These action items concerning the energy conservation are not being actively pursued. We are waiting for developments on the Energy Management Plan.

7.13 - Recommendations to optimize ventilation. This activity is progressing, but has turned out to be a major project, and no easily obtainable solution is foreseen for some time.

7.6 - Availability of off-site government facilities. No further progress is reported. A request has been made to visit the 1600 series warehouse buildings on the Arsenal during the visit of Bureau representatives, July 5-7. However, because of operations scheduled in this area, this visit has been rescheduled for July 10.

7.7.2 - Layout of tourist routes. The Bureau has verbally approved the tour routes and given the authority to proceed on most areas. Drawings have been completed showing the approved changes and these drawings are being sent to the Bureau, to the attention of Mr. Frere. Workorders have been written for most of the work and some of the work has already begun.

7.4 - Evaluation of organizational structure and projected changes thru 1985. This activity, due to its nature, is more a function of mint management, and not one of the study committee. Some recommendations by the study committee can be anticipated at the conclusion of the study.

7.7.1 - Optimizing of office space to meet the 1985 projections. No problems are anticipated. Some recommendations may become necessary at the conclusion of the study.

4.11 - List of OSHA non-compliance. No final formal list was made. One important item was obtaining of the cost from Bliss Co. to up-date the standard coin presses to OSHA requirements. The material cost/press alone is quoted at \$19,450. Labor cost would be additional to this. No recommendation by the study committee can be made at this time regarding the course of action to be taken (to invest in upgrading, or to remove these presses from production).

4.20.1 - Show security system on drawings. Activity completed.

This concludes the progress report.



Schedule of Installation of  
Feeder Bowl Assembly Enclosures

Press Ref. Designation

Week Starting

TB-4, TC-3	July 2
TB-5, TB-6	July 9
TB-7, SB-1	July 16
SB-2, SB-3	July 23
SB-4, SB-5	July 30
SB-6, SB-7	August 6
SB-8, SB-9	August 13
SB-10, SB-11	August 20
SB-12, SB-13	August 27
SB-14, SB-15	September 3
SB-16, SB-17	September 10
SB-18, MB-13	September 17
MB-14, MB-15	September 24
MB-16, MB-17	October 1
MC-1, MC-2	October 8
MC-3, MC-4	October 15
MC-5, MB-1	October 22
MB-3, MB-4	October 29
MB-5, MB-6	November 5
MB-7, MB-8	November 12
MB-9, MB-10	November 19
MB-11, MB-12	November 26

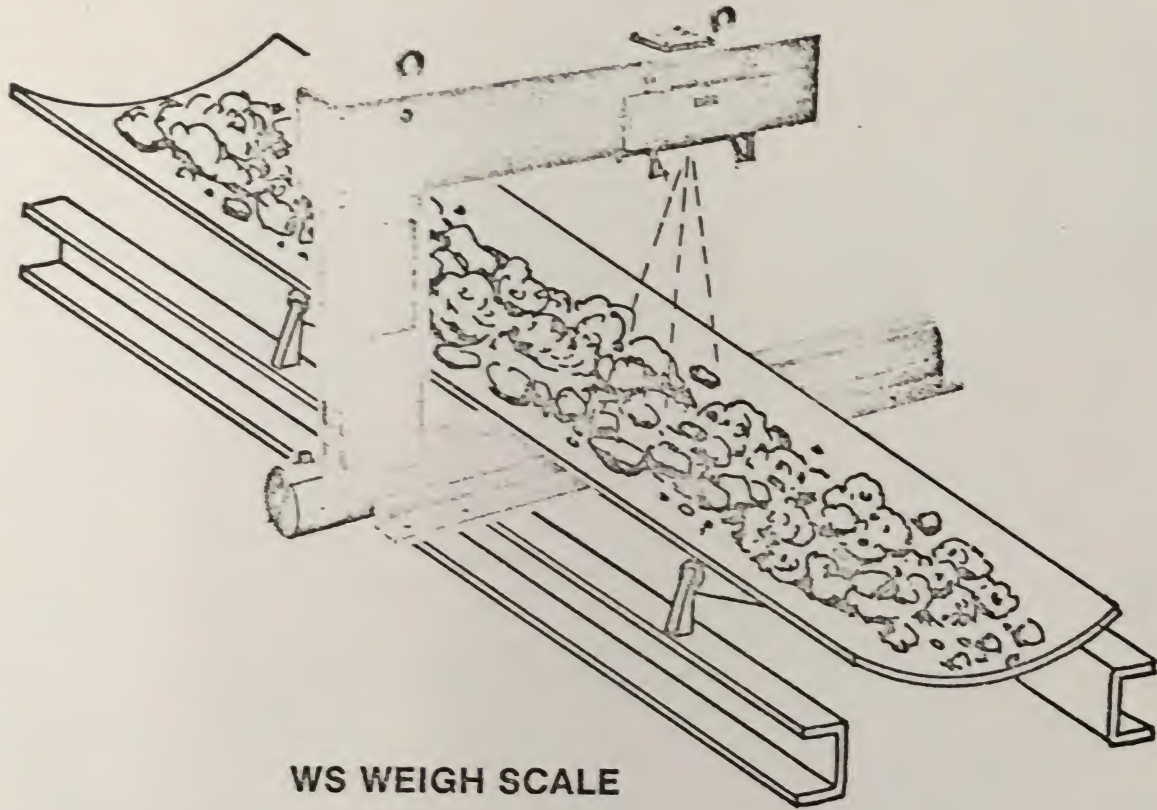
TABLE III

1985 MATERIAL HANDLED - STRIP, SCRAP, BLANK, COIN PER 24 HRS.

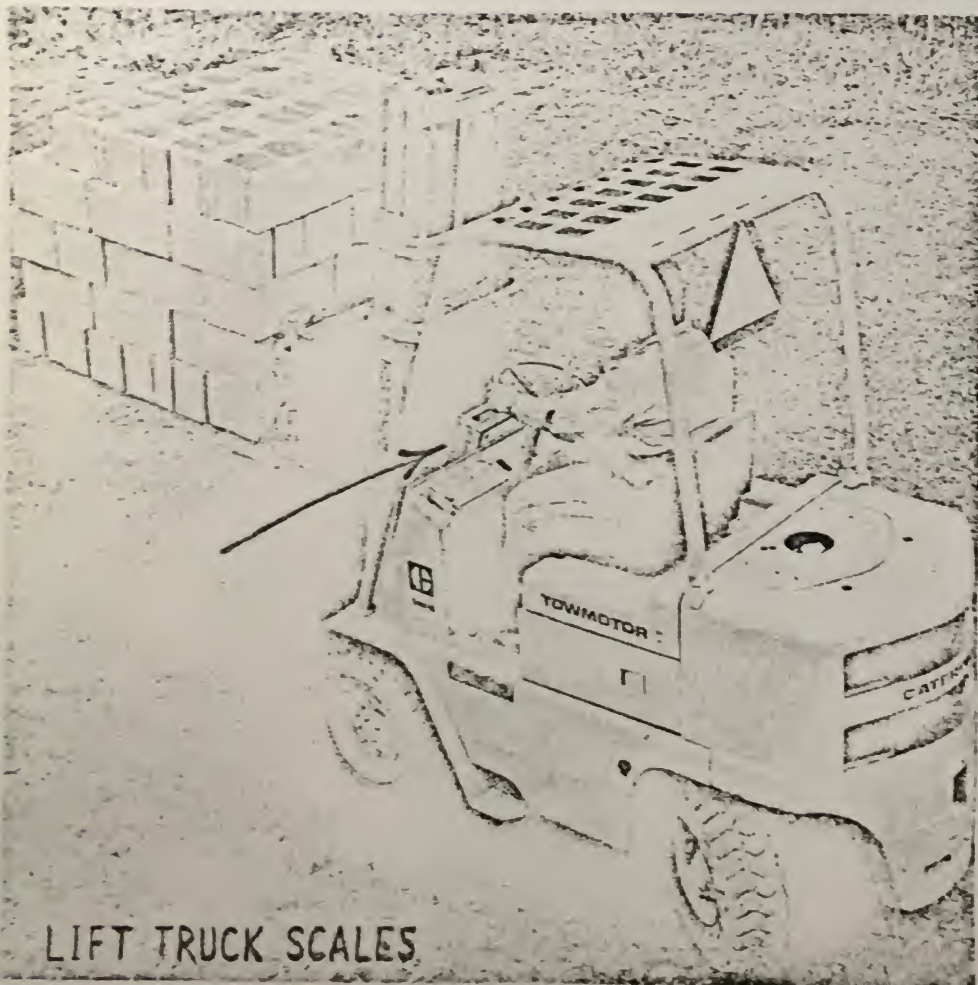
	1¢	5¢	10¢	25¢	50¢	\$	TOTAL
1985 REQUIR. - PIECES - LBS	21,375,000 146,400	2,567,000 28,300	3,483,000 17,400	3,300,000 41,250	550,000 13,750	250,000 12,500	31,525,000 259,600
STRIP-YIELD REQUIRED-LBS COIL WT-LBS COILS	75% 195,200 7,000 27.9	70% 40,430 5,300 7.7	70% 24,860 3,800 6.5	70% 58,930 3,500 16.8	70% 19,640 3,500 5.6	70% 17,860 3,500 5.1	- 356,920 - 69.6
SCRAP - lbs. BOXES @3,500 lbs.	48,000 13.9	12,130 3.5	7,460 2.1	17,680 5.1	5,890 1.7	5,360 1.5	97,320 27.8
BLANKS - TANKS @4,300 lbs.	34.0	6.6	4.1	9.6	3.2	2.9	60.4
COIN-PIECES/BAG BAGS TOTAL BAGS/FRB PALLET FRB PALLETS BAGS/WOOD PALLET WOOD PALLET	5,000 4,275 80 53.4	4,000 642 60 10.7	10,000 348.3 6.9 40 8.7	4,000 82.5 1.6 40 2.1	2,000 275 5.5 40 6.9	1,000 250 5.0 40 6.3	- 6,615 83.1 24.0



# NUCLEAR WEIGH SCALES



WS WEIGH SCALE



LIFT TRUCK SCALES

CRANE SCALES

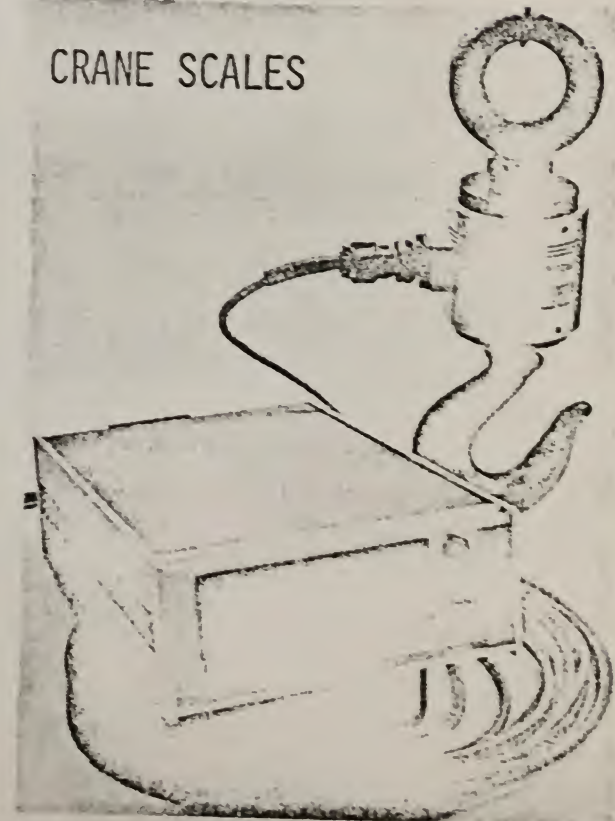




EXHIBIT "A"

# STAMPING

Under the Die Conveyors

a Productivity Booster



# Campbell

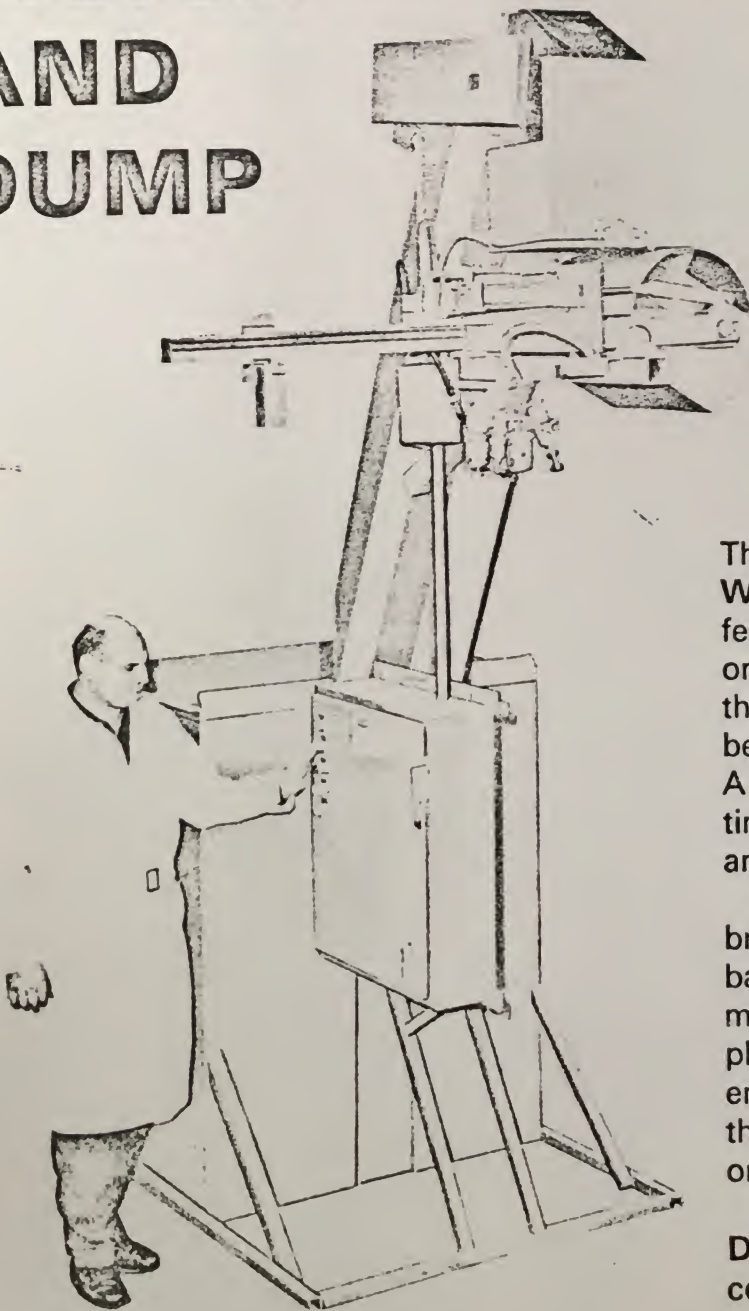
EXHIBIT "A"

## PRODUCT APPLICATION

### WEIGH AND DUMP

*CYCLE CONTROLLED BATCH  
FEEDERS FOR . . . . .*

- FURNACES
- WASHERS
- PLATING BASKETS
- CONVEYERS
- PACKAGING



This *Campbell* floor feeder has a standard **Weigh and Dump** accessory to do batch feeding. Parts are elevated into a basket at one end of a counter balanced beam. When the desired weight (count) is reached, the beam tips and signals the elevator to stop. A cycle timer, having allowed sufficient time for enough parts to be elevated, dumps and resets the basket for another load.

Many of these machines are used to feed broad ranges of parts to: furnaces, plating baskets, washers, conveyers, and packaging machines. This machine was built for complete automatic feeding of die cast aluminum engine parts for chemical treatment. Only the counterweight was reset to change from one part to another.

Approximate price for the **Weigh and Dump** accessory is \$1400.00. Hopper and controls are extra; priced according to capacity and degree of control needs.



### Campbell

MACHINES COMPANY

46400 Grand River Avenue  
Novi (Detroit) Michigan



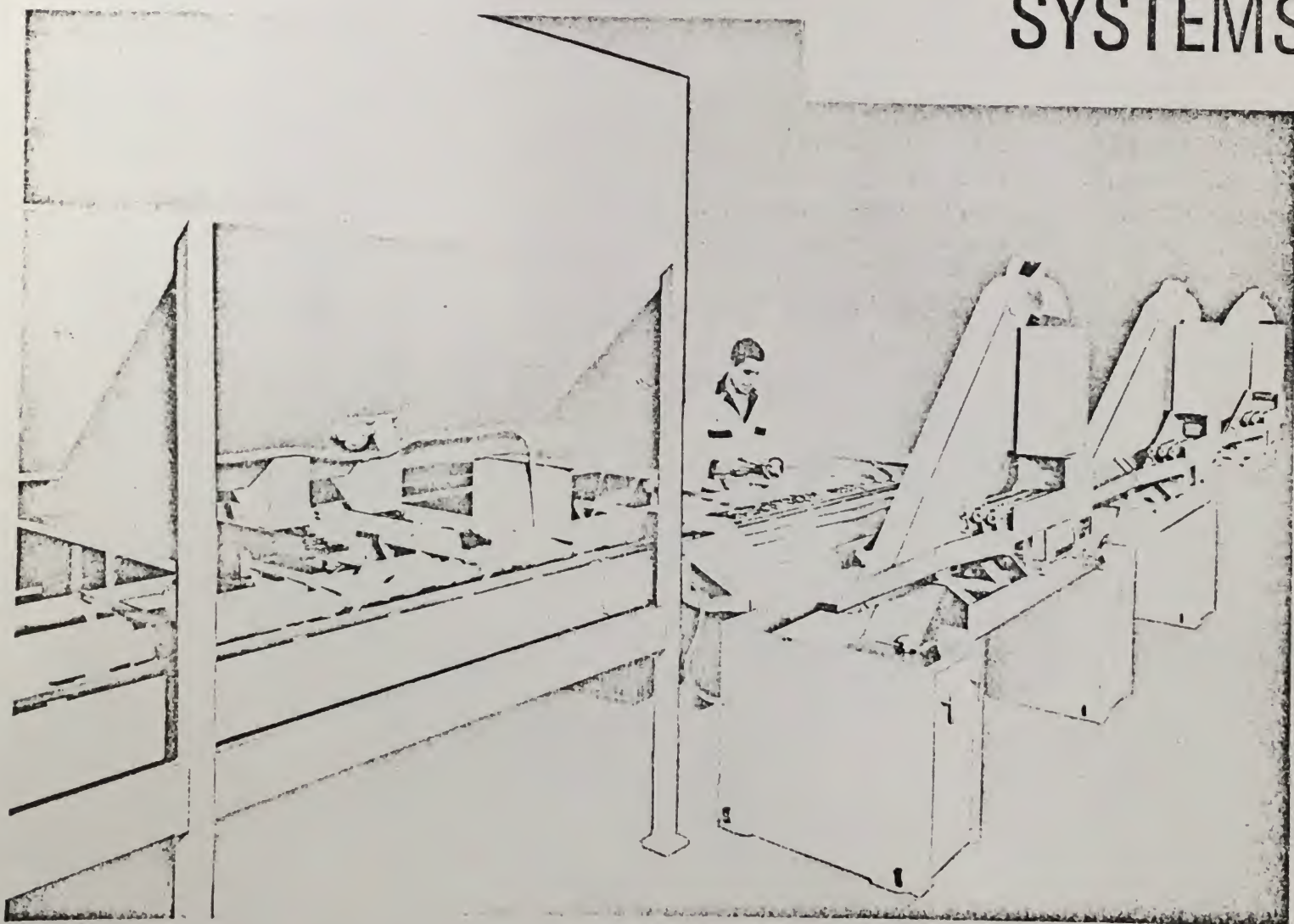
# Campbell

EXHIBIT "A"

## PRODUCT APPLICATION

Complete in-process storage and feed systems are a *Campbell* specialty. Standard floor feeders, orientors, and bulk storage bins are used to produce efficient, low cost parts handling systems of all sizes.

## PARTS STORAGE AND FEED SYSTEMS



Here is a small part of a multi-feeder ink cartridge system that handles more than a million parts a day. Filled cartridges are conveyed to bulk bins and withdrawn on demand and fed, oriented to marking machines at 200 pieces per minute. Three color batches can be handled at one time.

Spark plugs, pipe fittings, gears, engine valves, rocker arms, bearings, springs, pistons, bushings, valve lifters, and numerous other production parts are processed at lower cost by automatic feed systems. Maybe you can realize a labor savings with *Campbell* equipment.



**Campbell** MACHINES COMPANY

46400 Grand River Avenue  
Novi (Detroit), Michigan

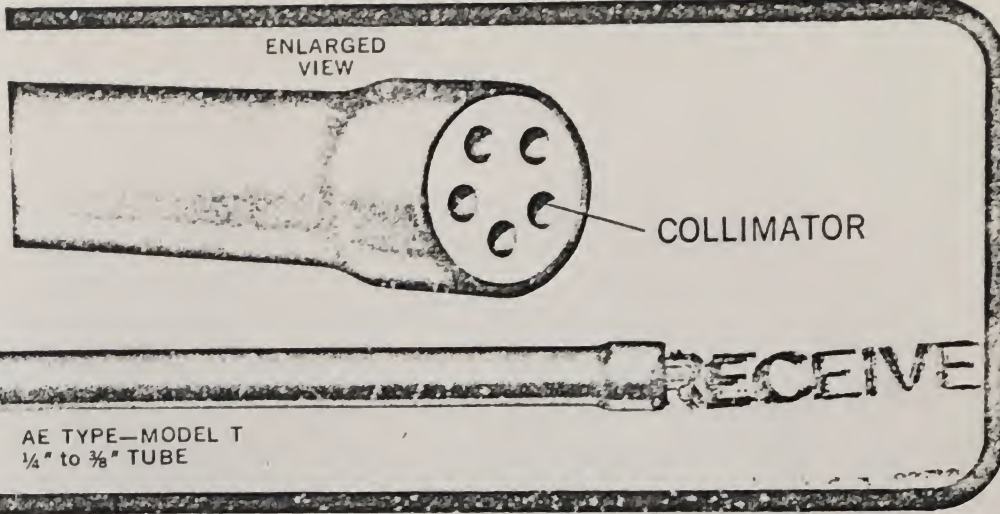


NOISE

CONTROL ASSOCIATES, INC.

32 PARK STREET  
MONTCLAIR, NEW JERSEY 07042

STAHOVIC



AE TYPE—MODEL T  
1/4" to 3/8" TUBE

# Tube Type Air Ejector Muffler

OFFICE OF  
SUPERINTENDENT  
U. S. MINT AT DENVER

AE TYPE — MODEL T

NOISE CONTROL ASSOCIATES, INC.  
P. O. BOX 261  
MONTCLAIR, N. J. 07042

**Pinpoints Highly Concentrated Air Stream for  
Noise-Free Parts Ejection**

Units are made with the unique air savings collimator muffler insert mounted in a tube. Permanently installed in a 12" length of copper tubing, the collimator accurately directs a highly concentrated and intensified air stream to the exact point required.

Uses less air to do the job—as much as 75% less. Drastically cuts air consumption and operating cost. Reduces noise level well below OSHA requirements.

Easily bent, the tube may be cut to any desired length and positioned to suit set-up. Makes it easy to get into even extremely tight quarters.

Supplied with either 1/4" or 3/8" tubing. Can be quickly connected to air line with standard tube fittings.

CALL  
(201) 746-5181

## SPECIFICATIONS AE TYPE — MODEL T

MODEL	T28	T38
Tube Diameter	1/4	3/8
Overall Length	12	12
ea.	\$ 5.00	6.00

# Air Ejector Collimator Muffler Insert

AE TYPE — MODEL I

**For Direct Installation into Air Hole Outlets  
of Dies, Molds, and Other Equipment.**

*Used for Air Ejection, Education,  
Blow-offs, Wipes and Air Cleaning.*

These collimator muffler inserts are used where it is necessary to drill air holes directly into the equipment. Provides a highly concentrated air stream with intensified thrust for effective noise-free ejection.

They can be easily installed directly into the air hole outlet, merely by drilling or reaming the proper hole size to accommodate the collimator muffler insert.

Noise Control Associates, Inc.  
32 Park Street  
MONTCLAIR, NEW JERSEY 07042  
Phone 201 746-5181

## SPECIFICATIONS AE TYPE — MODEL I

MODEL	I08	I18	I28	I38	I48	I68	I88
Diameter	1/4	13/32	17/32	21/32	53/64	11/16	13/16
Length	1/4	13/32	15/32	9/16	5/8	23/32	13/16
ea.	\$ 1.80	2.10	2.45	3.15	4.20	5.20	6.25



# EXHIBIT "C"

April 21, 1977

Mr. Frank H. MacDonald  
Acting Director of the Mint  
Washington, D. C. 20220

Dear Mr. MacDonald:

Attached is a report of concepts Mr. Al Vaitaitis has formulated regarding improving the controls of coin production equipment to take advantage of state-of-the-art advances. The subject of the report was discussed between Dr. Goldman and Mr. Vaitaitis, and this report is a follow-up to that discussion.

If it appears that this concept has merit, Mr. Vaitaitis is qualified and could proceed with further in-depth study and development of the concept.

Sincerely,

(Mrs.) Betty Higby  
Superintendent

Enclosure

cc: Dr. Alan Goldman  
Asst. Dir. for Technology

Mr. George Ambrose  
Asst. Director for Production

superintendent  
deputy superintendent  
building & mechanical division

## MODERNIZATION OF ELECTRICAL CONTROLS FOR COINING EQUIPMENT

The electrical controls of coining equipment, especially the punch presses and the coining presses, are basically the same for presses of 1906 as well as of 1976 vintage; the control logic is accomplished by electromagnetic relays. It is a system known as the conventional hardwired relay system.

The electrical/electronic industry has made a number of advances in the last two decades. It would seem logical for the Bureau of the Mint to at least take a look at these new developments and control modes.

About ten years ago, due to more successful manufacturing techniques, the solid-state devices started replacing the conventional hardwired relay systems. This system--the conventional hardwired solid-state logic system--was slow to be adopted by industry because most engineers familiar with relay systems found it difficult to become familiar with solid-state logic. In addition, to change a control sequence in a hardwired system requires the time-consuming chore of new documentation and of rewiring the logic system components. It would probably be disadvantageous to try to accomplish a changeover from relays to solid-state devices for coining equipment.

The latest state-of-the-art in this field is the Programmable Controller (PC). PC is a control system consisting of solid-state functional components that can be easily programmed to control almost any type of repetitive process. The PC performs essentially the same functions as solid-state logic systems or relay control systems. The PC offers exceptional reliability and space savings, plus the flexibility of simplified field modification.

The conventional hardwired relay, or hybrid solid-state logic system continuously monitors inputs, and through the use of hardwired connections, makes decisions based on the conditions of the inputs. In the PC, logic sequence and storage is not accomplished by point-to-point wiring, but by a digital memory which essentially stores the desired relay contact status (binary "0" is normally open; binary "1" is normally closed). The unit scans the memory for these instructions and acts upon the instructions based on the status of inputs to the controller. As with hardwired systems, the decisions result in output signals which control motor starters, solenoid valves, indicators, alarms, etc.

As mentioned earlier, industry was slow to accept the solid-state logic systems for a number of reasons. With a Programmable Controller, logic changes are easily made in the field by simply adding new instructions and deleting the obsolete instructions. The PC can be easily programmed by anyone familiar with standard relay ladder logic, conventional digital logic, or Boolean equations. Today, many PCs require little more of operating and maintenance personnel than a basic familiarity of logic diagrams and simple relay circuitry.



A basic PC is designed to perform simple repetitive functions such as sequencing, ON-OFF controlling, interlocking or status monitoring. There are many different PCs on the market with a variety of optional "extras." By simply adding more modules, one can obtain features such as internal programmable counters, timers, memory functions, data transfer functions and basic arithmetic functions.

As a standard procedure, a new piece of equipment could be purchased without the control hardware. All output and input devices (limit switches, pushbuttons, pressure switches, motor starter coils, solenoid valves, etc.) would be wired by the equipment manufacturer to an interface point (terminal strip or connector). The manufacturer would provide only a control drawing, traditionally in the standard relay ladder logic format. The customer (the U. S. Mint) would simply interconnect the equipment to the Programmable Controller and program it to perform the control logic.

There is a variety of schemes on how to organize the overall control system. A single PC could be, for example, provided to control all the punch presses, another all the annealing equipment, etc., if the production "line" layout remains unchanged in the Denver Mint. In the case of an automated production line, one PC, or a part of a larger PC could be used to control all of the equipment of the automated line.

Interconnections among the PCs could then create an overall control and monitoring system, with practically unlimited benefits for production control, maintenance, and upper management as well. Various instantaneous and accumulated readouts of production data, the instantaneous indications of trouble spots for maintenance, and practically anything that management would desire could be very easily provided.

Presently, most of the coining equipment is controlled by the conventional hardwired relay systems. The solid-state logic control is used to some extent. These machines are performing satisfactorily, and a change to a more modern system is not imperative. The subject of control modernization, and especially the application of the Programmable Controller, becomes important and at least worthwhile studying in view of some of the activities that the Bureau of the Mint has recently undertaken. An important and related activity is the "Review and Identification of Potential Bureau of the Mint Automated Systems" study, being carried out by the PRC Information Sciences Company. The subject study, no matter how identified, is in reality a study to modernize the science of management by obtaining better management tools. It is in this area of better management tools that the concept of Programmable Controller could be very well applied. In fact, the success of any computerized system for automation greatly depends on the inputs to the system. The utilization of the PC could be an excellent source of reliable data collection for the computerized Production, Maintenance Control, Coin Distribution and Financial Management Information systems. It would be not only an aid, but actually a part of the "Process Control," to which the PRC report briefly alluded on the final page and then apparently dismissed it. Contrary to what the last paragraph of the PRC report concludes, making the individual components of the production line operate more efficiently is a prerequisite to a computerized process control.

The subject of modernization of electrical controls, in general, and the application of programmable controller concept, specifically, is an area that should be given serious thought.



UNITED STATES GOVERNMENT

# Memorandum

TO : Evelyn T. Davidson

APV  
Albert P. Vaitaitis

FROM : Electrical Engineer - Project Director

DATE: June 26, 1978

SUBJECT: Denver Mint Improvement Study

In order to meet our objectives set out in the study, we at this time have come to the following conclusions:

1. Blanking operations should be moved out of the existing building. The three basic choices will be either to locate this operation on a one floor addition on the west side of the building (approximately from the west dock to the south end of the building), in the basement of the present building after extensive modifications, or to relocate it to an off-site facility.
2. Annealing operation, which would basically stay in its present location, still looks at this time a little crowded. However, we are still investigating ways to improve this area, which closely ties in with the upsetting and riddling processes.
3. The main and the south pressrooms would become the stamping areas, possibly relieving the second floor pressroom as well as the tramway building for other uses.
4. Should the study further prove that the best solution for the blanking operation is its relocation to the off-site facility, and if no good workable solution can be found for annealing-upsetting-riddling operations, we may at that time consider a relocation of the annealing operation to the off-site facility together with the blanking operation:
5. It would be desirable to have a new building on the existing site for storage and shipping of all (90 day demand) subsidiary coin, and for storage and shipping of some of the minor coin. This new building would possibly replace the two existing south Butler buildings or replace one and expand further into the yard area.

A meeting of the Project Committee is tentatively scheduled to be held on Thursday, June 29, @2:00 P.M. in the training room to discuss our position in preparation for the meetings with the Bureau of the Mint representatives. Your presence is requested.



# Denver Mint Improvement Study

Page 2

Copies to: Lawrence ✓  
Darlington  
Summers  
Sjaardema  
Lord  
Neal  
Wells





# DEPARTMENT OF THE TREASURY

WASHINGTON, D.C. 20220

OFFICE OF  
DIRECTOR OF THE MINT

JUN 23 1978

RECEIVED

Mrs. Evelyn T. Davidson  
Superintendent  
United States Mint  
Denver, Colorado 80204

JUN 26 1978

OFFICE OF  
SUPERINTENDENT  
U. S. MINT AT DENVER

Dear Mrs. Davidson:

Your Denver Mint Improvement/Expansion Study progress report, for period ending June 16, 1978, has been received. Your evaluation of various alternatives during the all-important investigative phase (Series 7) appears to be on schedule. Comments on your progress report are as follows:

Continue to consider use of a Butler Building for subsidiary coin storage; however, you are correct in requesting clarification of the "target" storage levels of minor and subsidiary coins. The date you recommended, July 7, will be scheduled for discussion of the item. A new policy for the Denver Mint will be developed during this meeting after considering recommendations of the responsible personnel. It is possible that storage should be itemized under "active" and "long-term" storage. All "active" storage should be on FRB steel pallets. "Long-term" storage should be patterned to the facility limitations. In order to incorporate future "active" storage and shipment of subsidiary coins on FRB pallets it may be necessary to establish a marshalling area-based upon a monthly listing of scheduled subsidiary coin shipments which could be provided by the Office of Production in a timely manner.

Mr. Vaitaitis' report on the Industrial Noise Control Workshop was beneficial and used in the establishment (letter 6/20/78) of a Mint policy on intended level of compliance with OSHA Noise Control Standards.

The sound tests taken on punch press #4, with and without the enclosure, are very good. We are concerned about the temperature problems caused by the enclosure and will want to discuss the possible solution of the problem by forced ventilation.

The differential noise levels of a 32-punch steel die (non-stepped and stepped) are greater than anticipated. This 10 dbA reduction warrants further work - at Philadelphia and SFAO, as well as at the Denver Mint. We will need to evaluate blanking die configurations on a Mint-wide application basis.

orig: Al Vaitaitis

copy: Harry Lawrence  
Quane Spardema  
Lancey Reed

Wm. Darlington  
Wm. Summers  
Dick Lord



Keep Freedom in Your Future With U.S. Savings Bonds



In your determination of optimum equipment spacing and arrangement - it is agreed dependent upon which equipment/processes must be moved out of the existing building. Automation of materials handling (such as the conveyors for the penny lines at the Philadelphia Mint) should be considered. The Mint has awarded a R & D contract to the Southwest Research Institute to determine equipment necessary to implement a process which automatically counts/weights pennies, packages pennies into the ideal container for wholesale distribution, and assembles the containers into unit loads on FRB pallets with minimal labor. It is possible, however, that space requirements for an automatic system would be greater than for manual counting and bagging. We want to discuss your considering this in your counting/bagging area, on our July 5 visit.

The report concerning programmable controllers (PC) for use with 10 or 12 coin presses is considered worthwhile and you are encouraged to include in your future planning. We are presently soliciting bids on 8 to 16 new quad coin presses - dependent upon availability of FY 1978 funds. Delivery is 60 weeks after award of contract - if wiring can be made adaptable for a PC and can be incorporated - we will make the necessary revisions. We are also developing a Mint-wide coin press replacement plan, including long-term actions on current Mint presses and modifications to meet OSHA standards. We would like to discuss, in detail, during the 7/5-7/7 meeting.

We are preparing a letter outlining further necessary action in pursuit of our Energy Management Plan. The letter will provide for completion of listings of capital type improvements, implementation of maintenance-type energy saving improvements, and reporting procedure on progress being made.

Further discussions with Treasury Department Real Property personnel indicate that a new DoD list of surplus facilities has been made available. They say the nearest excess facilities are at Pueblo, Colorado. They also say the contamination existing in 1601 and 1606 are a problem and they would rather work with us to develop long-term agreements for buildings 362 and 262 if they would meet the Denver Mint needs. We will discuss these items during our 7/5-7/7 meeting. We have abandoned plans to visit buildings 1601 and 1606 on July 10 as previously planned.

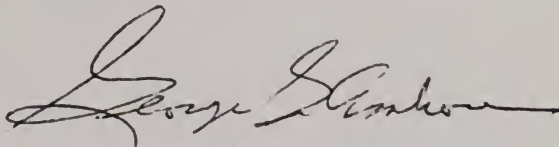
With regard to planned improvements in the Public Area, the Director's letter to the Denver Mint (6/16/78) specifically approved certain items on modifications for the tour route improvements and related office relocations. The decision on the employee entrance/exit must be further evaluated and will be discussed during our visit 7/5-7/7.



A preliminary list of agenda items, relating to the Denver Mint Improvement/Expansion Study, which we would like to discuss are as follows:

- Present planning - which processes/functions will remain in the current building and which are proposed to be relocated.
- Area allocation and process flow in present building, under new concept of operations.
- Establish and refine alternatives for processes/functions planned to be moved out of the current Mint building.
- Coin Storage criteria.
- Coin press replacement plan.
- Alternatives for SFAO production support - cut blanks or cut blanks annealed and cleaned - at various production levels. Include, also, the alternative that the Denver Mint may be scheduled to produce the SFAO scheduled production of up to 1.8 billion pennies per year.

Sincerely,

A handwritten signature in dark ink, appearing to read "George G. Ambrose", with a stylized, flowing script.

George G. Ambrose  
Acting Director of the Mint

*Lawrence*

DENVER MINT IMPROVEMENT STUDY  
PROGRESS REPORT

August 11, 1978

Our effort for the last few weeks was concentrated on the following items:

1. Production of additional 1.8 billion cents annually (SFAO share).  
A total of fifty (50) 6K-225 type coining presses would be required. We came up with a new layout in the South press room, comfortably accomodating this number, and with enough space left in the S.E. corner for a 2,000 lbs/hr. capacity annealing line for stand-by. This layout includes four (4) 4,000 lbs/hr. capacity annealing lines for normal operation. Should the decision be made to move some annealing (it would have to be two (2) 2,000 lbs/hr. capacity lines) to the Rocky Mountain Arsenal, six (6) additional 6K-225 type presses could be accommodated in the South press room. These six (6) presses would be used for stamping of subsidiary coin, or for future expansion of cent production. The stamping of all subsidiary coins can be accommodated in the Main press room. This effort would require six (6) 6K-225, eleven (11) Columbia and sixteen (16) Standard type presses. Utilization of more than 16 Standard presses, and at the same time reducing the number of 6K-225 type presses, presents a space problem in the Main press room. We abandoned the idea of locating any coining presses in the present C & R room.

To summarize, the inclusion of 1.8 billion cent coins in Denver's annual production requires a total of fifty-six (56) Standard type presses. Fourteen (14) additional 6K-225 type presses would be required. All stamping operations would be done in the South and Main press rooms.

2. Feasibility of relocating some annealing to RMA. This option is feasible, however, cost will be a determining factor. Important items to be considered are the availability of natural gas and steam. If natural gas is not available, other fuel, such as propane, can be used. If available steam is not adequate, our own steam generation can be considered.
3. Review and firming up of overall material flow concepts. We revised previously established Tables I, II and III (enclosed) to include (in a separate column) the additional 1.8 billion annual cents. We also found it necessary to revise the capacities (basically down) of the coin counters, which increased the number of counting stands. This caused no problem, as there is adequate space available in the present C & R room, especially if the counting/bagging/palletizing of cents is done in the present Process Weigh area.

Some concern is being expressed by the first-line supervision of the C & R branch about the "splitting-up" of the branch if counting is done in two locations. As far as the Study Committee is concerned, this should not be an important factor, as long as such "splitting-up"



improves the overall production and material flow. Some changes in the long-established traditional production organizational structure may well be one of the final study recommendations.

Another look was taken at the location of the upsetting operation, which up to now was left in the existing second floor area. The first line supervision from both the annealing and upsetting branches contributed many good ideas, and we are presently seriously considering locating the upsetting operation in the basement, "in-line" with annealing operation. This concept lends itself very well as far as the flow of 1¢ blanks is concerned. These blanks, after upsetting, could easily be conveyed vertically up to a 1¢ blank holding/surge/distribution container, located in the center of the South press room, near/between the two elevators. No good solution was found yet on how to move the subsidiary blanks to the Main press room, if the upsetting of these blanks would be done also in the basement. Leaving the upsetting of the subsidiary blanks on the second floor is still a possibility. This again would involve "splitting-up" the branch, but, at the same time, would help to completely automate the production of cents.

One of the problems to be solved is the metal dust of subsidiary blanks. An appreciable amount of dust exists after annealing. Possible improvement could be the use of warm (or hot) rinse water (cold rinse water is presently used). We are looking into a possibility of pre-heating the rinse water by running it thru coils submerged in the skip tank. The acidic water in this tank gets hot from the hot annealed blanks, causing safety problems. Some of this water is routinely drained and fresh cold water dilutes the solution, and more acid has to be added, causing a waste of acid. Routing rinse water thru submerged coils (the coils would have to be stainless steel) in this tank could possibly result in a better rinsing process, elimination of the hot water problem in this open tank, and a saving of acid.

More metal dust in the subsidiary blanks appears after the upsetting operation, especially in dimes. A riddling process presently used to remove some of the dust is very inefficient. An improved procedure is warranted, and the proper place in the process should be in-line with upsetting.

In reviewing and firming up the various concepts of material handling we are testing each of them for three conditions:

- (a) the equipment layout must be of a configuration allowing us to operate by present methods until the automation is phased in;
- (b) another easy "manual" means must exist to replace any portion of the automated system in case of breakdowns;
- (c) the accessibility to maintenance shall not be impaired by the addition of automation.

Consistent with the above requirements we are planning to prepare a series of concept drawings, one of which (D2-51-72) is included as an illustration. These drawings will be very helpful for cost estimates, as well as for future specification preparation.

4. Cost estimates. We have contacted GSA and two engineering firms with regard to possible assistance in firming up our concepts, further developing our material handling procedures, and assisting in arriving at construction costs, equipment costs, etc. The reason for this approach is the realization of our limitations in these areas, a desire to adapt the state-of-the-art, and our lack of sufficient manpower to carry out this major responsibility in a timely manner. GSA stated that this also exceeded their normal function and their expertise, and further they suffered from limitations on available manpower. The two engineering firms approached on the project were both highly interested in getting involved, impressed us with their expertise, and convinced us that through their involvement much ground work will already be prepared for future movement in the direction the Mint Improvement Project proceeds. One engineering firm is currently preparing a proposal for the services they can provide toward this project, and the cost of these services. The other firm, which is smaller in size, may be asked to do the same, if we are convinced they also have the expertise and manpower. If the cost for this service is reasonable, we will proceed to secure it, and, barring any unforeseen delays in procurement, we may be able to conclude the study and prepare our final report at the end of October.

We held off the formal revision of the action plan and the planning and scheduling chart at this time, pending the outcome of securing the outside services, at which time we will be able to clearly see the way the study is to proceed to conclusion.



TABLE I

## ESTIMATED EQUIPMENT CAPACITIES/DAY

Estimates are based on actual production records. Blanking figures are shown for 15" bronze strip, 13 11/16" nickel strip, 12" strip for all other denominations. Blanking capabilities for 1¢ blanks with carbide dies are assumed.

Revised 8/10/78

PROCESS	1¢	5¢	10¢	25¢	50¢	\$1.00
<u>BLANKING</u>						
Bliss HP2-100						
(15") carbide die	6,000,000					
(15") steel die	6,000,000	3,300,000	5,000,000	2,500,000	1,700,000	1,100,000
Bliss HP2-45						
(12") steel die (standby)			4,500,000			
<u>ANNEALING</u>						
4,000 lbs/hr line	13,200,000	5,200,000	16,000,000	5,700,000	3,000,000	1,440,000
2,000 lbs/hr line	4,500,000	2,000,000	4,800,000	1,900,000	840,000	400,000
<u>UPSETTING</u>						
Auto-Feed	7,350,000	4,550,000	5,000,000	3,300,000		
Hand-Feed					1,500,000	840,000
<u>STAMPING</u>						
100-ton Columbia	579,000				235,000	210,000
Bliss 6K-200	579,000	482,000	579,000	309,000		
Bliss 6K-225	579,000	482,000	579,000	309,000		
100-ton Standard	338,000	260,000	313,000	154,000		
<u>COUNTING</u>						
1 Stand (2 double counter)	3,450,000	2,880,000	3,000,000	1,680,000	720,000	600,000
Abbott Electronic	4,200,000					

TABLE II

ESTIMATED EQUIPMENT REQUIREMENTS FOR 1985  
 (Denver 1¢ blanking requirement based on 15" strip, carbide dies)  
 Includes additional 7.5M cents daily (SFAO share)

Revised 8/10/78

EQUIPMENT TYPE	AVERAGE DAILY PRODUCTION REQUIREMENT							TOTAL EQUIPMENT	
	1¢ (SFAO)	1¢ (DENV)	5¢	10¢	25¢	50¢	\$1.00	REQ'D	ON HAND
	7,500,000	21,375,000	2,567,000	3,483,000	3,300,000	550,000	250,000		
<u>BLANKING</u>									
Bliss HP2-100	1.25	3.57	.78	.70	1.32	.33	.23	8.18	8
Bliss HP2-45									2
<u>ANNEALING</u>									
4000 lbs/hr line	.57	1.62	.50	.22	.58	.19	.18	3.86	4*
2000 lbs/hr line									2
<u>UPSETTING</u>									
Auto-Feed	1.02	2.91	.57	.70	1.00			6.2	8
Hand-Feed						.37	.30	.67	1
<u>STAMPING</u>									
Bliss 6K-200 & 225	12.95	36.91		6.02				55.89	42
100-ton Columbia					10.68			10.68	11
100-ton Standard			9.87			4.0	1.82	15.69	24
<u>COUNTING</u>									
Stand	2.17	4.98	.89	1.16	1.96	.76	.42	12.34	11
Abbott Electronic		1.0						1.0	1

\* three (3) on-line, 1 spare (not installed)



TABLE III

Revised 8/10/78

1985 MATERIAL HANDLED - STRIP, SCRAP, BLANK, COIN PER 24 HRS.

Includes additional 7.5M cents daily (SFAO share)

	1¢ (SFAO)	1¢ (DENVER)	5¢	10¢	25¢	50¢	\$	TOTAL
REQ - PIECES - LBS	7,500,000 51,370	21,375,000 146,400	2,567,000 28,300	3,483,000 17,400	3,300,000 41,250	550,000 13,750	250,000 12,500	39,025,000 310,970
STRIP - YIELD REQUIRED-LBS COIL WT-LBS COILS	75% 68,500 7,000 9.8	75% 195,200 7,000 27.9	70% 40,430 5,300 7.7	70% 24,860 3,800 6.5	70% 58,930 3,500 16.8	70% 19,640 3,500 5.6	70% 17,860 3,500 5.1	- 425,420 - 79.40
SCRAP - lbs. BOXES @3,500 lbs.	17,125 4.9	48,800 13.9	12,130 3.5	7,460 2.1	17,680 5.1	5,890 1.7	5,360 1.5	114,445 32.7
BLANKS - TANKS @4,300 lbs.	11.95	34.0	6.6	4.1	9.6	3.2	2.9	72.35
COIN-PIECES/BAG BAGS TOTAL BAGS/FRM PALLET FRM PALLETS BAGS/WOOD PALLET WOOD PALLET	5,000 1,500 80 18.75	5,000 4,275 80 53.4	4,000 642 60 10.7	10,000 348.3 50 6.9 40 8.7	4,000 82.5 50 1.6 40 2.1	2,000 275 50 5.5 40 6.9	1,000 250 50 5.0 40 6.3	7,372 101.75 24.0

# memorandum

## RECEIVED

DATE: OCT 20 1978

REPLY TO  
ATTN OF: M-PSUBJECT: Meeting Summary -- Mint Improvement/Expansion Study --  
October 11 and 12, 1978

NOV 2 1978

TO: Stella B. Hackel

OFFICE OF  
SUPERINTENDENT  
U. S. MINT AT DENVER

Subject meeting was conducted with the Mint Improvement/Expansion Study project leaders from the four (4) field offices involved - Denver Mint, Philadelphia Mint, West Point and SFAO. The meeting also was attended by Mint Bureau personnel and Treasury Department personnel from the Office of Budget and Program Analysis and the Office of Real Property Management.

The four (4) primary objectives of the meeting were:

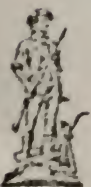
- (a) To learn from each field office the methodology used in doing the study, alternatives being considered, and progress to date on their segment of the study.
- (b) Using the proposed relocation of the virgin metal storage and shearing operation from the GSA depot, Belle Mead, N.J. (60 miles from the Philadelphia Mint) to Buildings 307 and 308 in Frankford Arsenal (7 miles from the Philadelphia Mint) as a case study - run through the considerations and cost benefit factors which must be addressed and the method of applying cost factors in order to meet the requirements of OMB Circulars A-104 and A-109.
- (c) To the extent we could, at that time, apply findings from the Buildings 307/308 case study to other elements of the Improvement/Expansion Study at each field office.
- (d) To provide uniform guidance to the field office project leaders toward completing the study and outline standardized cost consideration elements intended to meet criteria contained in A-104 and A-109 - so that in bringing together the final package rework and restructuring will be minimized.

Basically, the study criteria looks ahead to 1985 and provides for a buildup of coin production capacity to 22 billion coins (16.0 billion cents) by 1985:

12 Billion (Eastern sector)  
In Eastern sector we are considering  
Philadelphia Mint and West Point  
together

10 Billion (Western sector)  
In Western sector we are  
considering Denver Mint  
and SFAO together

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan





A second important criteria is that expansion of coin production into an off-site facility will be for 1-cent coins only. The study criteria also proposes to improve the work environment in the existing Mint Facilities by reducing congestion, improving work flow and improvements in noise control.

A number of analyses have been completed at Philadelphia and Denver Mints and the results indicate at this time final considerations will be as follows:

FOR PHILADELPHIA MINT

- (a) Propose to relocate medal storage/loop shearing operation from GSA depot, Belle Mead to the Frankford Arsenal.
- (b) Relocate coil storage and other warehouse functions from DoD 20th Street warehouse in Philadelphia to the Frankford Arsenal.
- (c) Propose to blank all purchased 1-cent strip at the Frankford Arsenal (at today's level of 1-cent production Philadelphia Mint blanks about 700,000 pounds purchased strip per week) - furnish up to 220,000 lbs/wk blanks cleaned and annealed for West Point.
- (d) Relocate certain blanking presses, an annealing furnace, and coin presses to Frankford Arsenal and improve arrangement of remaining equipment - provide enclosures for blanking presses and reduce congested areas.
- (e) Expand 1-cent production only into Frankford Arsenal - will blank, anneal, upset, strike, store and ship 1-cent coins. All operations on 5-cent through 1-dollar will remain in existing facility.

FOR WEST POINT - Currently produces 1-cent coins from Philadelphia Mint blanks and purchased blanks.

- (a) Considerations for increasing present 1.8 billion (cent) capacity with 20 Mint type presses to 2.8 billion level (cent) production, if 20 new Bliss presses are installed, is being given there.

FOR DENVER MINT

- (a) Primary consideration revolves around relocating the strip blanking operation from the existing facility to a new addition on the west side or to the Rocky Mountain Arsenal (Bldg. 362).

We are currently doing a cost/benefit analysis on:

1. Doing all blanking in the west side addition.

- 3
2. Doing 1-cent blanking at Rocky Mountain Arsenal and 5-cent - 1-dollar in the new west side addition.
  3. Doing all blanking at Rocky Mountain Arsenal.
  4. Doing a part of 1-cent annealing at Rocky Mountain Arsenal.
- All coin press stamping 1-cent through 1-dollar will be in the Denver Mint.
  - We are looking seriously at improvements in work flow and material handling improvements which involves conveyerized systems as opposed to fork lift handling.
  - We are looking at doing the annealing and cleaning of blanks for 1.8 billion cent coins at SFAO and are also looking at adding the 1.8 billion 1-cent production planned for SFAO by 1985, at the Denver Mint as a cost benefit tradeoff.
  - We are currently palletizing 1-cent and 5-cent coins only for shipment out of Denver due to restricted vault storage areas which cannot accomodate pallet storage. The study will try to move us into 100% pallet storage/shipment of coins by reallocation of some of the space in the Denver Mint for coin storage.

#### FOR SFAO

We are looking at improving work spaces and work environment there while maintaining a coin production level of 1.8 billion cents per year. We are looking at production on the basis of blanking strip at the SFAO and on the basis of obtaining blanks cut only in one case and ready for stamping in another case from the Denver Mint.

During the two day conference it was established that we have several categories of cost to consider:

(At Philadelphia Mint) - Frankford Arsenal

#### Building Costs

Modifications and repair  
Equipment Installation  
Building Equipment

#### Production Equipment Costs

Equipment  
Installation



(At Denver Mint) - Rocky Mountain Arsenal

Have above cost considerations

+ New Building Costs (West Side addition)

+ Production Operations Cost - when we compare blanking operations being retained on site versus being relocated to Rocky Mountain Arsenal.

Also, we will need to break down costs in the above categories by year in which funds would be obligated in terms of FY 79 dollars.

We also established that for all field offices:

Building modification and repair costs would be depreciated over 20 years.

New Building costs would be depreciated over 30 years.

New Production equipment would be depreciated in accordance with existing schedules for depreciation.

The Philadelphia Mint was the only field office which had developed preliminary cost data. On the information available at the time it was apparent that:

- (a) If the central boiler plant and existing electrical sub-station is operated at the Frankford Arsenal versus our having to install a steam plant/heating system and our own electrical transformer station - a substantial savings in capitol investment can be made.
- (b) We need to review and probably reduce the scope of security systems planned for the Frankford Arsenal operation.

It appears by law we must involve GSA in certain building related engineering work and construction work at the Frankford Arsenal; such as:

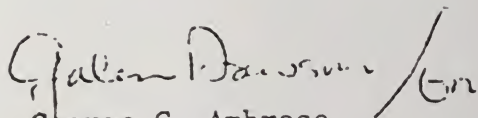
- Roof Repair
- Electrical Sub-Station installation
- Steam Boiler/heating plant
- Washroom/locker renovation
- Ventalation systems

General Services Administration items must be separately identified due to need for adding a GSA administrative and construction management fee to the usual cost.

We would expect to get GSA involved at the Denver Mint if we make a new addition on the west side of the building. We would not get GSA involved on building modification at Rocky Mountain Arsenal since this is an Army - DoD facility which we would occupy under a DoD permit - and we would probably handle all engineering and construction contract work there.

We expect to visit the Philadelphia Mint and Denver Mint (certain Mint and appropriate Treasury Department people) once during the month of November for final phase review.

Our target date for final study report from the field offices is November 30, 1978. We will evaluate and consolidate the material into a final report during the month of December in conjunction with Mint-wide management review and Treasury Department review and have ready to present in January.



George G. Ambrose  
Assistant Director  
for Production

cc: SB Hackel  
FH MacDonald  
ML Lonkay  
JE Sparks  
AJ Goldman  
GG Ambrose  
GD Dawson



Demon Mint Improvement Study 1978

